Bay of Bengal Large Marine Ecosystem Project

Monitoring and Evaluation of management effectiveness for adaptive management of MPAs in Indonesia's BOBLME area

BOBLME-2014-Ecology-01

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Monitoring and Evaluation of Management Effectiveness for Adaptive Management of MPAs in Indonesia's BOBLME Area

Subcomponent 3.2
Marine Protected Areas in the Conservation of Regional Fish Stocks

"Provision of Services Relating to the Assessment and Planning of Effective Management of two MPAs in Sumatra Coast, Indonesia

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BOBLME	Bay of Bengal Large Marine Ecosystem
BPSPL	Office of Coastal and Marine Resources Management
BPSDM	Agency for Human Resource Development
CI	Conservation International
CSR	Corporate Social Responsibility
CTC	Coral Triangle Center
DGCF	Directorate General of Capture Fisheries
E-KKP3K	Management Effectiveness of Aquatic, Coasts and Small Islands Conservation Areas
FAO	The Food and Agriculture Organization of the United Nations
FFI	Fauna and Flora International
KKJI	Directorate of Marine and Aquatic Resources Conservation
KKPN	Kawasan Konservasi Perairan Nasional
KSDA	Natural Resources Conservation Office
LKKPN	Loka Kawasan Konservasi Perairan Nasional Pekanbaru
MMAF	Ministry of Marine Affairs and Fisheries
MPAs	Marine Protected Areas
MPA101	Basic MPA Management
MPAG	Marine Protected Areas Governance
NMRP	National Marine Recreation Park
SOP	Standard Operational Procedure
TNC	The Nature Conservancy
UPTD	District-Technical Implementing Unit
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature

FOREWORD

Bay of Bengal Large Marine Ecosystem (BOBLME) is a regional initiative involving eight countries namely Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand, with the aim to building a strategic action plan for sustainable use of the marine resources of the Bay of Bengal by the member countries on the basis of a sound understanding of the ecosystem as well as the socio-economic environment.

Under Component 3.2 of the project: Marine Protected Areas in the conservation of regional fish Stocks, The Food and Agriculture Organization of the United Nations (FAO) and the Directorate of Fish Resources, Directorate General of Capture Fisheries (DGCF), Ministry of Marine Affairs and Fisheries (MMAF) have agreed to implement Sustainable Management of the Bay of Bengal Large Marine Ecosystem (BOBLME) Project.

In implementing this project, the Directorate of Marine and Aquatic Resources Conservation of MMAF, Indonesia in collaboration with all related stakeholders has implemented a project entitled “Provision of Services Relating to the Assessment and Planning of Effective Management of two MPAs in Sumatra Coast, Indonesia" in Pulau Pieh National Marine Recreation Park (NMRP), and Sabang District MPA using Technical Guidelines for Evaluating the Management Effectiveness of Aquatic, Coasts and Small Islands Conservation Areas (E-KKP3K Technical Guidelines).

During the project implementation, experts and resource persons were invited in the workshops and consultations to provide inputs and recommendation for better result. Stakeholders that involved in this project were Technical Unit responsible for MPAs management (LKKPN Pekanbaru), academia/universities (i.e. Syiah Kuala University in Aceh, and Bung Hatta University in Padang City), local communities and traditional institution (e.g. Panglima Laot in Aceh), local governments, districts and provincial agencies for marine and fisheries, and also NGOs (WCS, TNC, CI and FFI).

This report, contains data and information about the existing ecological and socioeconomic data, identification of data gaps, assessment of management effectiveness of Sabang District MPA and Pulau Pieh NMRP, and also their management effectiveness

levels as a basis for improving the management of these MPAs over time and providing scientific information for adaptive management in the future.

I would like to thank and appreciate the FAO, the Directorate of Fish Resources, DGCF of the MMAF, and all stakeholders who have supported and contributed to the implementation of the Assessment and Planning of Effective Management of two MPAs in Sumatra Coast, Indonesia.

Jakarta, Desember 2013

Director for Marine and Aquatic Resources Conservation

Agus Dermawan

EXECUTIVE SUMMARY

Indonesia, as one of the countries involved in Bay of Bengal Large Marine Ecosystem (BOBLME) project, has appointed two marine protected areas: Sabang District MPA and Pulau Pieh National Marine Recreation Park as pilot sites to support and achieve BOBLME Project Component 3.2 "Marine Protected Areas (MPAs) in the conservation of regional fish stocks – obtaining consensus on approaches to the establishment and management of Marine Protected Areas and fish refugia for sustainable fish management and biodiversity conservation objectives." Both MPAs represent two different institutional forms of MPA management unit: Sabang is managed under the District Government, and Pulau Pieh is a National MPA managed under the national government (Ministry of Marine Affairs and Fisheries/MMAF).

Sabang District MPA is situated along eastern coast of Weh Island, Province of Aceh, and was reserved in 2010 by the Decree of Mayor of Sabang City No. 729/2010 with total area of 3,207.98 Hectares. It was established to address pressures and threats due to both natural man-made causes, and to promote balance between economic development and environmental protection. Issues facing by Sabang District MPA include decline of coral reefs conditions caused by natural disaster like tsunami and coral bleaching, and harmful human activities such as uncontrolled coastal development and the use of environmentally destructive fishing gears, such as Japanese trawl, purse seine, and cyanide. Furthermore, high dependency among fishers, and high demand and consumption of reef fishes also contribute significantly to the degradation. Other visible issue was increasing tourist visitation that affects the quality of the beaches and beach erosions.

Pulau Pieh National Marine Recreation Park (NMRP) is located in West Sumatra Province and was established and managed by the Ministry of Forestry before being handed over to the Ministry of Marine Affairs and Fisheries (MMAF) in 2009. Under MMAF, to harmonize its management with the existing National MPA System under Law 45/2009 on Fisheries, Pulau Pieh was designated as Recreation Park through Minister of Marine Affairs and Fisheries Decree No. KEP.70/MEN/2009 with total area of 39,900 Hectares.

Issues facing by the Recreation Park include coral reef degradation; illegal exploitation of protected marine species; conversion of island's habitats; natural disaster; beach erosion; poor local people awareness toward conservation; and limited infrastructure to support effective management.

Assessments of management effectiveness were conducted in Sabang District MPA and Pulau Pieh NMRP through two separate 2-day workshops, one was held in Banda Aceh (for Sabang District MPA) and one was held in Padang City (for Pulau Pieh NMRP), respectively. During the first day of the workshop participants were exposed and trained on how to use the MPA management effectiveness score card developed by MMAF, which is called Evaluation Tool for Management Effectiveness of Marine Protected Areas (E-KKP3K); and in the second day, participants conducted evaluation of management effectiveness of their respective MPA.

Management Effectiveness Status: Sabang District MPA

Sabang District MPA has achieved management effectiveness level of 100% yellow with some management activities have already been carried out at the green and blue level, achieving 52% and 14%, respectively. The assessment results are as follows:

Ranking	No. of Question	No. of YES answer	Percentage
Red	8	8	100%
Yellow	11	11	100%
Green	21	11	52%
Blue	28	4	14%
Gold	6	0	0%

Achievements of yellow level include (i) successful establishment of MPA management unit (which was legalized through the Head of Marine Affairs and Fisheries Office Decree Number 523/80/2012) and is put under coordination of Marine Affairs and Fisheries Office of Sabang City; (ii) final drafting of management and zoning plan; (iii) making available facilities and infrastructure to support management; and (iv) securing funding for office operation and management works from municipal budget.

Achievements of green level are among others (i) improving qualifications of the members of management unit to support basic MPA management; (ii) making efforts to initiate partnerships with stakeholders; (iii) securing adequate equipment for office operation; (iv) better financial planning and securing funding from municipal budget; and (v) finalization of and formal submission of management and zoning plan document to the Ministry of Marine Affairs and Fisheries for approval.

Achievements of blue level include (i) providing support to strengthen local traditional institutions (Panglima Laot); (ii) implementing enforcement within the MPA using customary law and approaches; and (ii) acknowledging and inclusion of the MPA in Weh Island marine spatial plan.

To improve management effectiveness level towards 100% of green level, the management unit is recommended to:

1. Improve its management capacity functions such as surveillance, resource monitoring, and socio-economic and cultural monitoring;
2. Develop Standard Operational Procedure (SOP) for office administration and financial management; and for minimum facility and infrastructure; and
3. Develop SOP for and implementation of institutional strengthening, join patrol, resource management, and socio-economic and cultural strengthening.

Management Effectiveness Status: Pulau Pieh National Marine Recreation Park

Pulau Pieh NMRP has achieved management effectiveness level of 100% yellow with some management activities have already been executed at the green and blue levels, achieving 43% and 10%, respectively. The results of assessment are as follows:

Ranking	No. of Question	No. of YES answer	Percentage
Red	8	8	100%
Yellow	11	11	100%
Green	21	12	43%
Blue	28	4	8%
Gold	6	0	0%

Achievements of yellow level include (i) successful establishment of a task force to represent management unit (as indicated in Minister of Marine Affairs and Fisheries Regulation No. 24-2011 on the Organization and Working Procedures of Technical Unit of KKPN, based in Pekanbaru, Riau Province); (ii) final drafting of management and zoning plan; (iii) making available facilities and infrastructure to support management; and (iv) securing funding for office operation and management works from national budget of 2011 to 2013.

Achievements of green level include (i) making efforts to initiate partnerships with stakeholders; (ii) securing adequate equipment for office operation; (iii) better financial planning and securing funding from national budget; (iv) finalization of and formal submission of management and zoning plan document to the Ministry of Marine Affairs and Fisheries for approval; and (v) developing SOP of the Administration and Financial Management. The Recreation Park has been legally designated by Minister of Marine Affairs and Fisheries Decree No.70-2009.

Achievements of blue level include (i) socialization of MPA legal status to local communities and other stakeholders at district and provincial levels; (ii) development of boundary system; and (iii) acknowledging and inclusion of Pulau Pieh NMRP in both provincial and district marine spatial plans.

To improve management effectiveness level towards 100% of green level, the management unit is recommended to:

1. Achieve adequate number and qualifications of MPA managers in at least two of the following standard competency for MPA management: (i) MPA planning, (ii) monitoring and evaluation, (iii) surveillance, (iv) research, (v) natural resources survey/monitoring, (vi) socio-economic survey/monitoring, and (vii) fisheries management.
2. Make available adequate facilities and infrastructure to support MPA management such as (i) patrol boat, (ii) information board on zoning and zoning regulation, (iii) communication devices related to surveillance activity, (iv) tourism facilities and infrastructures, (v) jetty, (vi) information center, and (vii) mooring buoy.

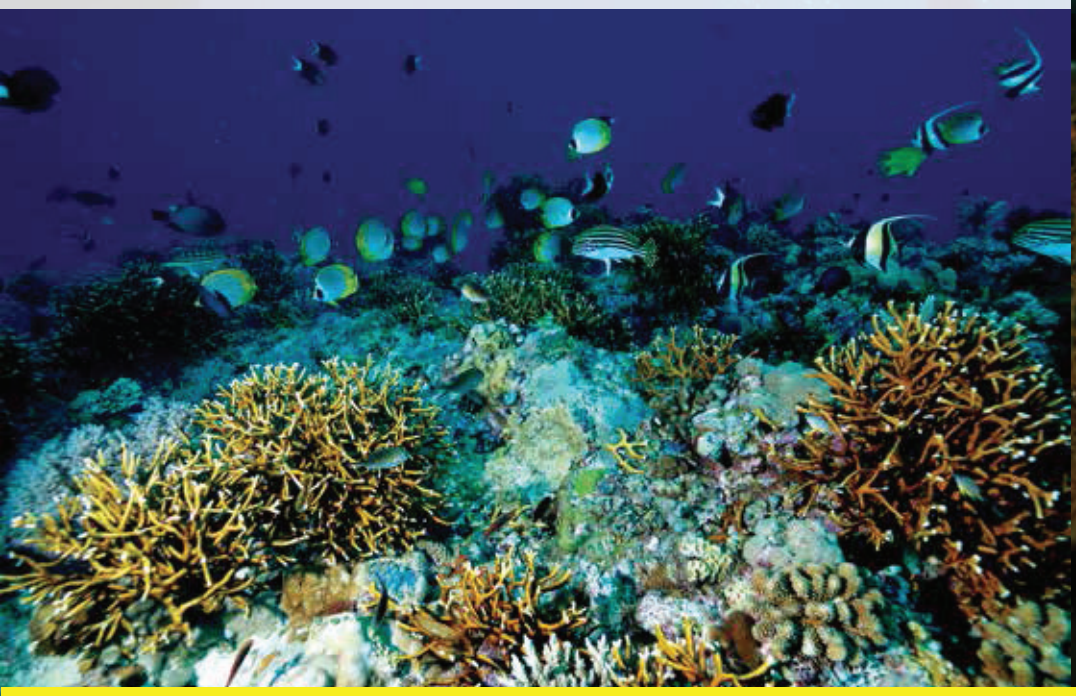
3. Ensure that the management and zoning plan document are officially legalized by Ministry of Marine Affairs and Fisheries.
4. Prepare for Standard Operational Procedure (SOP) for office operational and MPA management. SOP for office operational includes office administration, finance, facilities and infrastructure management, and the basic SOP for MPA management include joint patrols, resource management, institutional strengthening, and socio-economic and cultural strengthening.
5. Execute the management and zoning plans.
6. Conduct the following programs in the implementation of the MPA management, i.e. institutional strengthening, resource management, strengthening of the socio-economic and cultural, one form of utilization for tourism within the MPA, fisheries management (capture and aquaculture), and research and education.

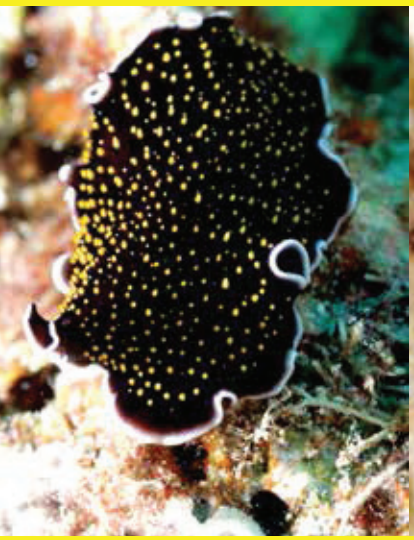
General Recommendation

1. In order to follow-up recommendations from this assessment, both MPAs need to strengthen their management capacity by achieving the required Special Standard Competency level through capacity development scheme organized by the Agency for Human Resource Development (BPSDM) of MMAF.
2. In regards to Pulau Pieh NMRP, the existing management unit (i.e. Pieh task force) should be elevated to strengthen its management and budgeting authority (i.e. as technical implementing unit). In the case of Sabang MPA, however, it should be established as district-technical implementing unit (UPTD) beyond the current organizational structure (under sub-division of District Marine Affairs and Fisheries Office).
3. In order to improve their management effectiveness, both MPAs should address the following management issues: making available adequate facilities and infrastructure; involving community and stakeholders in the management through partnership; producing utilization plans for tourism, fisheries management (capture and aquaculture), research, and education.

Next Step

To facilitate the effective implementation of E-KKP3K evaluation and monitoring tool on the ground, the tool needs to be equipped with supporting technical guidelines to make it more applicable to the MPA managers and evaluators





1. INTRODUCTION

1.1 Background

Bay of Bengal, which is surrounded by four South Asian and four Southeast Asian countries, is endowed by rich fisheries resource. Recognizing the importance of fisheries to local and national economic development in each country, Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand have been working together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and have laid the foundations for a coordinated program of action designed to improve the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

One of the objectives of the BOBLME Project Component 3.2 is Marine Protected Areas (MPAs) in the conservation of regional fish stocks – obtaining consensus on approaches to the establishment and management of Marine Protected Areas and fish refugia for sustainable fish management and biodiversity conservation objectives. This objective is relevant to Indonesia's effort to employ MPA as conservation vehicle to support sustainable fisheries production. Currently, there are 16 MPAs in Sumatra, Indonesia, that lie within the eastern boundaries of the BOBLME extending to a total 4,083.66 km^2 (Figure 1). Of these, two MPAs have been appointed by the Government of Indonesia as pilot sites for the Sustainable Fisheries Management of the BOBLME Project. They are Sabang District MPA and Pulau Pieh National Marine Recreation Park.

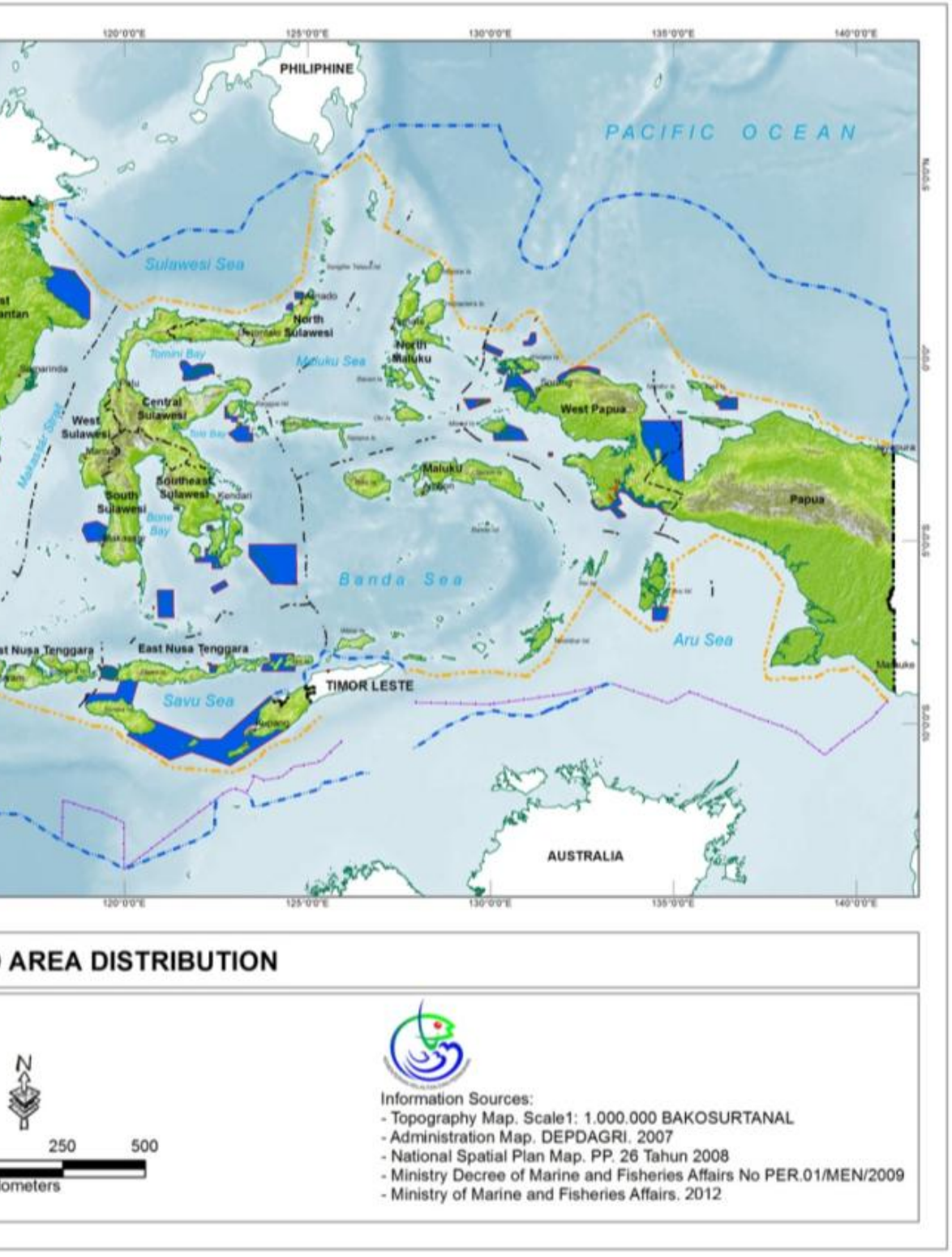
Sabang MPA is a district-based MPA situated along eastern shore of Weh Island of Aceh Province which covers a total area of more than 3,000 Hectares. It was declared by Sabang Mayor in year 2011 in order to strengthen the local customary law (Panglima Laot) in managing coastal and marine resources.

Pulau Pieh National Marine Recreation Park (hereafter Pulau Pieh NMRP) is located in West Sumatra Province. This is one of eight MPAs that have been transferred from the Ministry of Forestry to the Ministry of Marine Affairs and Fisheries (MMAF) in April 2009.

Subsequently, Pulau Pieh was then declared as National Marine Recreation Park by Ministry of Marine Affairs and Fisheries in late 2009 and covers 39,900 Hectares of marine area and islands of Pulau Pieh, Pulau Bando, Pulau Pandan, Pulau Air, and Pulau Toran.

Since the enactment of two key laws pertaining to the protection of marine natural resources (Law No. 31/2004 on Fisheries in conjunction to Law No. 45/2009 on amendment of Law No. 31/2004, and Law No.32/2004 on Local Governance) a new paradigm has emerged in the management of coastal resources, particularly in the development of MPA in Indonesia.

Figure 1. Distribution of Indonesia



's Marine Protected Areas in 2012

The laws essentially provide support for local government to more actively play role in the development and management of marine protected areas in their respective region. The legislation goes beyond mere semantics as it gives opportunity to local governments to have control over marine resources with support of national government. With such support, it is expected that local government able to do the development and management by themselves without compromising conservation objectives.

The two MPAs are part of the paradigm shift of Indonesia's policy towards establishing and managing MPAs both at local (district) and national level, relevant to the decentralization course in Indonesia. Both MPAs (Sabang and Pulau Pieh) have managed to generate their own management plan and certain management measures have been put in place. Management plan of Pulau Pieh NMRP was developed by Loka Kawasan Konservasi Perairan Nasional Pekanbaru (LKKPN); whereas, the management plan of Sabang District MPA has been finalized by the District Government in consultation with the local community and with support from Wildlife Conservation Society (WCS). Since the management plan has been finalized and implemented in both sites, it is necessary to start a periodic assessment to evaluate whether the management plan has been implemented as planned hence the management effectiveness.

1.2 Objective

The objective of this project is to document management status of Pulau Pieh NMRP and Sabang District MPA, and their management effectiveness level as a basis for improving management of these MPAs over time and providing scientific information for adaptive management in the future.

1.3 Project Output

Output of the project is a management status report of two pilot MPAs being assessed, which include the existing ecological and socioeconomic data, identification of data gaps, assessment of management effectiveness of Sabang District MPA and Pulau Pieh NMRP and a direction for more effective management strategies with community participation

1.4 Project Deliverables

Project deliverables include: i) inception report describing the clear plan of action; ii) bi-monthly progress reports to briefly report on the progress made; iii) report of the current status and progress on the implementation of management plan at Sabang District MPA and Pulau Pieh NMRP along with recommendations for improvement of the management, especially the community based/local institution based management.

1.5 Key Agencies for Project Implementation

In implementing this project, the Directorate for Marine and Aquatic Resources Conservation of MMAF Indonesia collaborate with partners such as: i) the government of Sabang City and Padang City; ii) the MPA management units (national and local); and iii) the Wildlife Conservation Society (WCS). Pulau Pieh NMRP is managed under National MPA Agency of Pekanbaru (LKKPN), and Sabang District MPA is managed by the local implementing unit under the District Marine Affairs and Fisheries Office. The Directorate of Fish Resource also involves in providing support on sustainable fisheries issues and program within the surrounding areas of MPAs. In this case, the Directorate undertakes an EAFM program that is important for the effective management of MPA in relation to its support to fisheries management.

The WCS is the key NGO partner for the project implementation as it has been working in Indonesia since 1995. In due course, WCS also involved other NGO partners, such as Conservation International (CI), The Nature Conservancy (TNC), and Fauna and Flora International (FFI), in executing this project.

WCS has been actively working with the government of Sabang City with support from the MMAF in establishing the District government-managed MPA in Sabang, Aceh Province. At the national level, WCS is also part of NGOs consortium under USAID Marine Protected Areas Governance (MPAG) program together with CI, CTC (Coral Triangle Center), TNC and WWF (World Wide Fund for Nature).

During the project implementation, experts and resource persons were invited in the workshops and consultations to provide inputs and recommendation for better result.

Stakeholders involved in this project were Technical Unit responsible for MPAs management (LKKPN Pekanbaru), academia/universities (i.e. Syiah Kuala University in Aceh, and Bung Hatta University in Padang City), local communities and traditional institution (e.g. Panglima Laot in Aceh), local government, districts and provincial agencies for marine and fisheries.

2. PROJECT SITES: SABANG DISTRICT MPA AND PULAU PIEH NMRP

Sabang District MPA and Pulau Pieh NMRP represent two different institutional forms of MPA management unit. Sabang is managed under the District Government, and Pulau Pieh is a National MPA that is managed under the national government (MMAF). Assessment of both types of management provides a picture and comparison on how the MPAs have been managed by national and local government.

2.1 Sabang District MPA

Sabang District MPA is managed under the Sabang City administration, where its coastal and marine areas are home of rich living resources. However, this area is facing threats and problems that would affect management of the resource. Establishment of Sabang District MPA is aimed to address these issues, and to promote balance between economic development and environmental protection.

Sabang District MPA was reserved in 2010 by the Decree of Mayor of Sabang City No. 729/2010. The total area of the MPA is 3,207.98 Hectares, comprises of Core Zones (65.06 Hectares), Limited Utilization Zone (113.42 Hectares), and Sustainable Fisheries Zone (3,029.50 Hectares). The establishment process was started in 2008 through identification of sites, scientific assessment, and public consultations at village and municipal levels (Mukminin *et al*. 2010). The process was carried out by a working group that was legally appointed by Mayor of Sabang City Decree No. 56/2010. The working group consists of representatives of various stakeholders from government agencies, village government, community, university, and NGOs.

Moreover, an MPA management body was formed and legalized by the Head of District Marine Affairs and Fisheries Office Decree No. 538/10/2012. The body consists of Marine Affairs and Fisheries Office officials and local leaders (Panglima Laot of Ie Meulee and Anoi Itam Villages). In addition, the MPA management plan has been developed and legalized by Mayor of Sabang City Decree No. 8 in 2013.

2.1.1 Rationale for the MPA designation

Eastern coast of Weh Island, which extends from Pantai Kasih at Ateuh Village down to the Ujung Seukein of Anoe Itam Village, harbors rich biodiversity and natural resources as well as the potential to support coastal fisheries and tourism sectors. This area has a long history of customary law implemented by community-based institution named Panglima Laot. Based on assessments in 2005 and 2006, the east coast of Weh Island (Sabang) has relatively higher marine biodiversity, live coral cover, and reef fisheries resources compared to other areas adjacent to the island (WCS, 2007). Such condition was strongly correlated to the active management and strong enforcement activities carried out by local community through the customary law. Moreover, strong understanding and supports from local community to marine conservation has led to establishment of Sabang District MPA (Figure 2). Its establishment was aimed to build stronger institutional capacity and local government support to implement marine conservation.

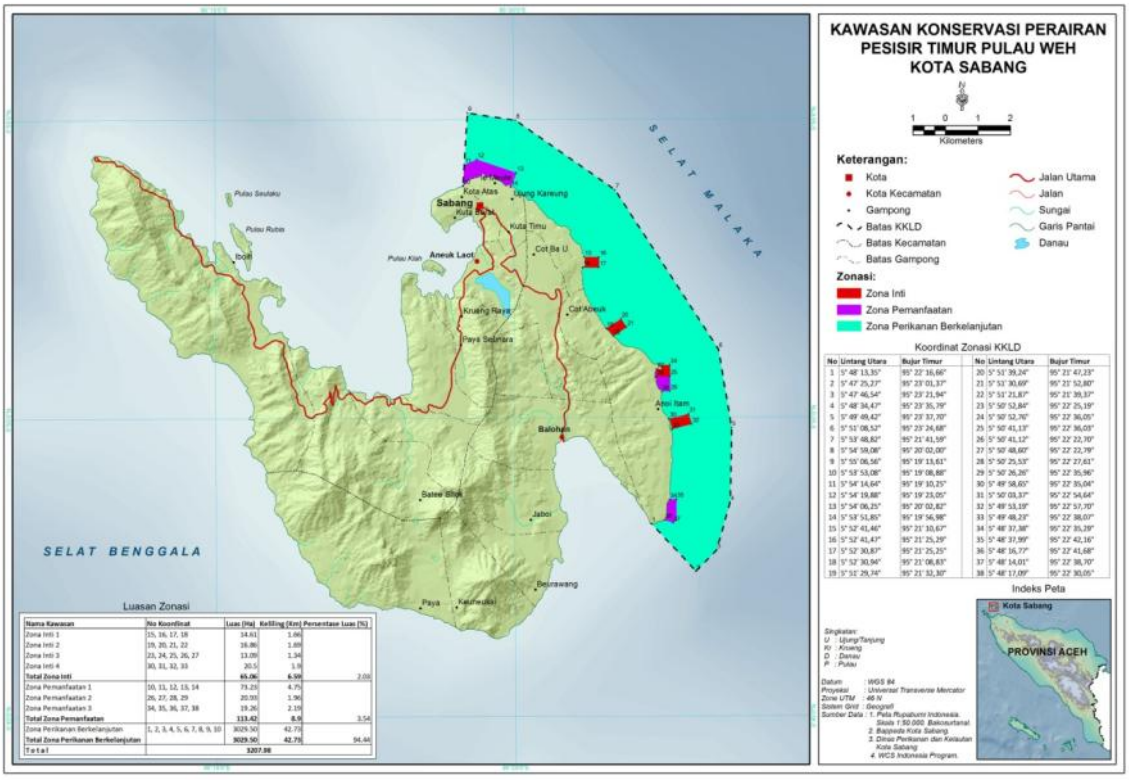


Figure 2. Map of Weh Island and Sabang District MPA on the eastern coast

2.1.2 Biophysical Setting

Live Coral Cover

According to Ardiwijaya *et al*. (2010a), 56 genera of scleractinian corals could be found in Weh Island waters. Sabang District MPA was dominated by coral reefs with relatively high live coral cover. Coral reefs in this area are dominated by *Acropora*, *Porites*, *Pocillopora*, and *Heliopora*; with relatively gentle bottom slope. In the northwestern part of Weh Island (covers the Iboih Recreation Park), live coral cover was also high. Other coral reefs that also dominate in this area were *Acropora*, *Porites*, *Pocillopora*, *Millepora*, and *Heliopora* especially in steeper bottom slope. On the west and southwest coast of Weh Island, coral reefs were found in small patches and were usually dominated by *Pocillopora* and *Acropora* species with massive, sub-massive or branching with short branches morphological forms of colony. This characteristic is due to the very dynamic and strongly influenced by the Indian Ocean oceanographic character on the west coast of Weh Island (BAPPEDA 2010). Of all 56 genera of scleractinian coral, 80% (45 genera) were found in the Sabang MPA, as complement of the 91% (51 genera) protected in the Iboih Recreations Park (WCS 2013, unpublished data).

Live coral cover in the Sabang District MPA is higher compared with the other area of the Weh Island (i.e. Iboih Recreation Park and open access areas). In 2009, mean live coral cover in the Sabang District MPA was 58.8%, Iboih Recreation Park 40.2%, and 42,5% in open access areas (Ardiwijaya *et al*. 2010b). Different value was found by Rudi *et al*. (2008) where live coral cover in the Sabang District MPA was 51.50%, Iboih Recreation Park 31.73%, and 22.83% in open access areas. However, finding of both studies were consistent that live hard coral cover on Weh Island was higher at reefs with fishing restriction (i.e. Sabang District MPA) compared with the Iboih Recreation Park and open access areas on Weh Island (Ardiwijaya *et al*. 2010b; Rudi *et al*. 2008), also consistent with previous reports (Campbell *et al*. 2006).

According to Muttaqin *et al*. (2011), from 2009 to 2011 live coral cover in Sabang District MPA were relatively higher compared to other areas (Iboih Recreation Park and open access areas) in Weh Island (Fig. 3). However, mass bleaching events that occurred during April

and May 2010 were affecting the live coral cover, causing mass coral mortality throughout the island. The variation of live coral cover from 2009 to 2011 is presented in Table 1.

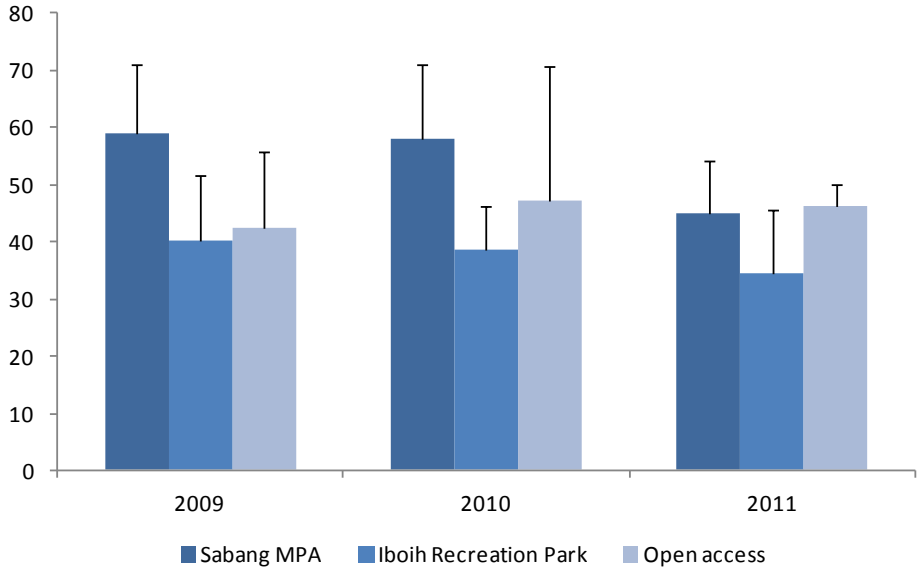


Figure 3. Live coral cover from 2009 to 2011 by management type in Weh Island (Muttaqin *et al*. 2011)

Table 1. The variation of live coral cover (%) from 2009 to 2011 in Weh Island

Management Type	2009	2010	2011
Sabang MPA	58.8	58,0	44.9
Iboih Recreation Park	40.2	38.7	34.6
Open access	42.5	47.3	46.1

2.1.3 Fisheries resource

Reef fish diversity on the east coast of Weh Island is relatively high and similar to the Iboih Recreation Park. In addition, reef fish stocks in the region are also high. High coral cover on the east coast of Weh Island has a positive relationship with the abundance and biomass of reef fish. Reef fish diversity of the east coast of Weh Island is relatively high and similar to reef fish diversity in the Iboih Recreation Park. In addition, the east coast of Weh Island also has high reef fish abundance. According to Ardiwijaya *et al*. (2010a), coral cover was

consistently highest in all years at the east coast MPA sites compared with the 3 other management areas.

Studies by Ardiwijaya *et al*. (2010a) from 2006 to 2009 showed that there were 530 reef fish species recorded in Weh Island waters. Approximately 74.7% (396) of reef fish species were found in the Sabang District MPA. In addition, mean reef fish abundance show a significant effect of MPA management in the Sabang District MPA (Figure 3). Overall findings showed that reef fish abundance and biomass (Figure 4) are highest within the areas where management controls are in place, suggesting that these controls should form a part of any future coral reef management strategies proposed for the region. Although a general decline in overall fish abundance occurred between 2006 and 2007 (Table 2), the cause of this is unknown and it was not statistically significant (Rudi *et al*. 2008). The fish biomass itself is shown in Table 3.

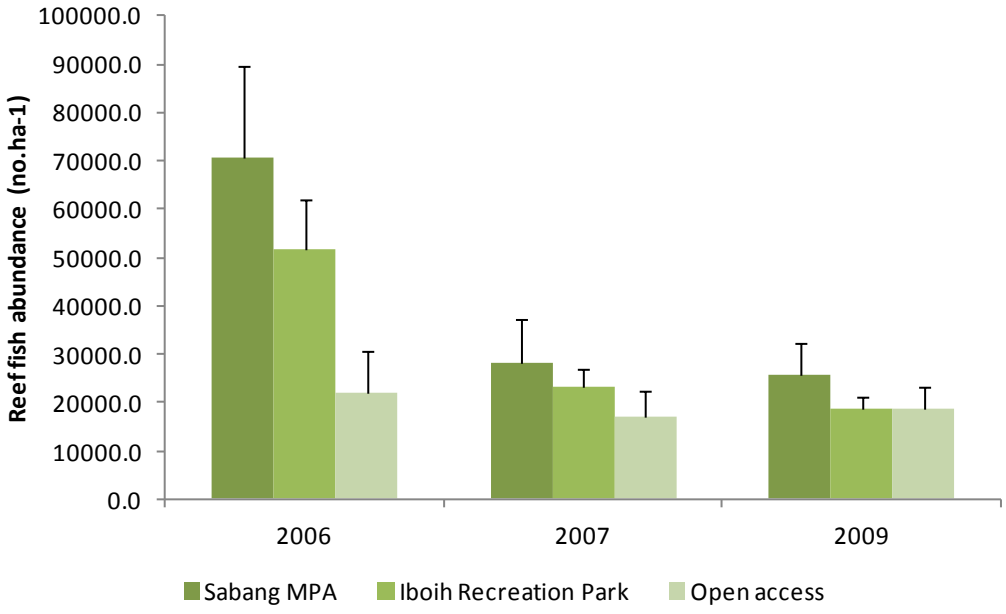


Figure 4. Reef fish abundance from 2006 to 2009 by management type in Weh Island

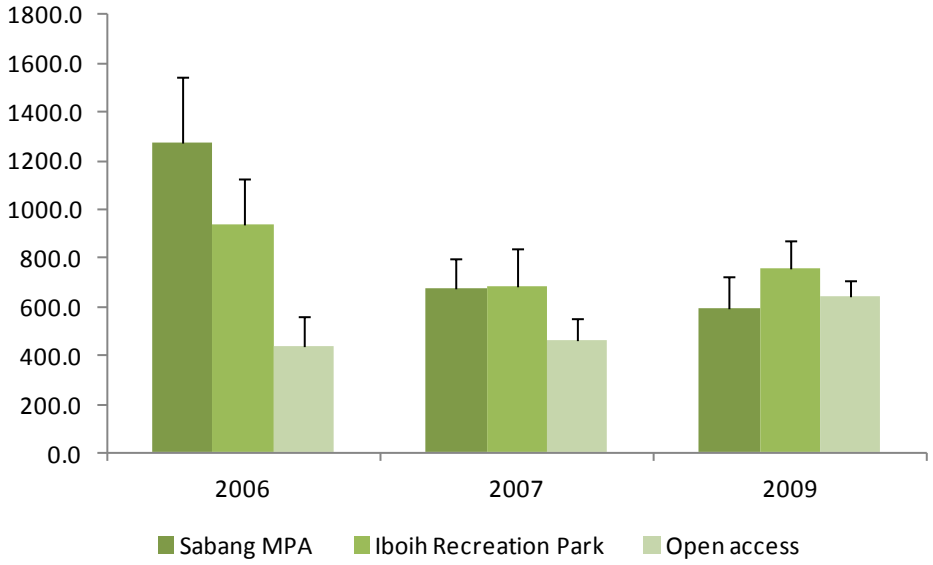


Figure 5. Reef fish biomass from 2006 to 2009 by management type in Weh Island

Table 2. The variation of reef fish abundance (ind/ha) from 2006 to 2009 in Weh Island

Management Type	2006	2007	2009
Sabang MPA	70511.0	28395.6	25550.8
Iboih Recreation Park	51731.0	23096.7	18928.9
Open access	22133.1	17230.0	18611.9

Table 3. The variation of reef fish biomass (kg/ha) from 2006 to 2009 in Weh Island

Management Type	2006	2007	2009
Sabang MPA	1271.6	673.5	591.3
Iboih Recreation Park	941.2	687.3	761.4
Open access	435.7	460.1	644.1

2.1.4 Social and Cultural Setting

The population of eastern coast of Weh Island was 9,818 and represented by 2,421 households (Table 4). Four villages can be found in Sabang District MPA, i.e. Kota Atas, Ie

Meulee, Ujung Kareung, and Anoi Itam. Detail of resident population of eastern coast of Weh Island can be seen in Table 4. Approximately 95% of the population in this area was with Islam denomination. Ethnically the residents were quite diverse since Acehnese, Batak (North Sumatra), Javanese, Sundanese (West Java), Makassar, and even from as far as Papua were reported to reside in this area.

Table 4. Demographic profile of Sabang District MPA (DKP 2012)

Lhok	Village	Population			Households
		Male	Female	Total	
Ie Meulee	Kuta Ateuh	2,269	2,533	4,802	1,115
	Ie Meulee	1,801	1,651	3,664	984
	Ujong Kareung	252	258	560	154
AnoeItam	Anoe Itam	343	449	792	168

The characteristic of community of the Sabang District MPA are similar to Weh Island and Acehnese society in general, i.e. they interact actively and perform mutual cooperation. The people can be categorized as modern society since they use modern utensils for their everyday life such as TV, mobile phone, refrigerator, motorbike, and cars. This life style was a result of the free port status of Sabang City that supports the flow of goods from abroad to Indonesia through this city.

Economic activities of the community in the Sabang District MPA are similar to other part of the island, where most of the residents were working as civil servants (including military and police) 49.5%, fishers 4.8%, and in private sector (6.7%), respectively. Fishers were ranked as 6th most sought livelihood, and obviously reflect one of the villages (Lhok Ie Meulee) as one of the most productive fishing areas in Weh Island.

2.1.5 Issues on Sabang District MPA management

Coral reefs in Weh Island are in general experiencing a decline. This occurs due to both natural and man-made causes. Natural factors causing damage to coral reefs include

tsunami in 2004 and coral bleaching event in 2010. Human activities inflicting damage include coastal development and the use of environmentally destructive fishing activities, such as Japanese trawl, purse seine, and cyanide.

In addition to the degradation of coral reef condition, high demand and consumption for reef fish in Weh Island has been causing high pressure toward reef fish populations. High price of particular reef fish group such as grouper and snapper have caused these two fish groups were heavily targeted by fishers on the east coast. Furthermore, increasing number of fishing fleets was also other factor that could potentially lead to over-exploitation to the reef fish resources.

Fishers of Weh Island have relatively high dependency on reef fish resources. Most of fishing grounds were on reef areas adjacent to the island. Fishing grounds for pelagic fishing were concentrated in the northern of the islands around Rondo Island, and the Indian Ocean waters. The main reef fishing grounds of fishers from Weh Island are near the Ie Meulee and Pria Laot waters, especially for handline fishing.

Increasing visitations of tourists to east coast of Weh Island are potentially increasing impacts to the environment. The quality of the beaches has been decreased due to presence of unmanaged garbage. In addition to waste problem, the beaches on east coast Weh island are suffered from damage by erosion. Beach erosion is exacerbating because many trees were uprooted or cut down by the local community.

2.1.6 Management and zoning plan of Sabang District MPA

Development of Sabang District MPA zoning plan was undertaken through two key steps: (i) by plotting all existing ecological and socio-economic data and information into a map; and (ii) through systematic conservation planning using spatial analysis. The latter was done to identify and select the initial core, tourism utilization and sustainable fisheries zones, respectively. Results of spatial analysis were then refined through a series of communication and consultation process, involving various stakeholders in Weh Island, including local community, government agencies, NGO, university, and private sectors.

The management objectives of Sabang District MPA as stated in the management plan documents are:

1) Healthy coral reef ecosystem to support life cycle of fisheries resources.
2) The MPA can provide fisheries resources that can be utilized sustainably by local people.
3) Strong customary institution to implement MPA management.
4) Strong support from municipal government in implementing MPA management.
5) Strong support from provincial and central government in implementing MPA management.

Management of Sabang District MPA will be implemented through three key strategies as follows:

1) Institutional Strengthening

   Institutional strengthening for Sabang District MPA would be carried out through two activities: capacity building and stakeholder involvement. Capacity building would include improvement of human resource capacity to implement MPA management through capacity building (training) on MPA management, tourism development, and tourism management. Stakeholder involvement is aimed to improve management effectiveness, which would be conducted through collaboration in monitoring and surveillance with other parties, as well as building strong relationship with provincial and central government.

2) Strengthening of resource management capacity

   Two major programs under this strategy are (i) protection, and (ii) rehabilitation of existing coastal resources through implementation of customary law.

3) Socio-cultural and economic strengthening

   Two major programs under this strategy are (i) improving community awareness on sustainable use of resources through awareness program and alternative livelihood development; and (ii) development of tourism sector.

2.2 Pulau Pieh National Marine Recreation Park

Pulau Pieh NMRP is located in West Sumatra Province and under jurisdiction of three districts, i.e. Padang City, Pariaman City, and Padang Pariaman District. The MPA was established and managed by the Ministry of Forestry before being handed over to the Ministry of Marine Affairs and Fisheries in 2009. To harmonize the management of Pulau Pieh NMRP with the existing National MPA System under Law 31/2004 on Fisheries, the Minister of Marine Affairs and Fisheries designated Pulau Pieh and the surrounding areas as National Marine Recreation Park through Decree No. KEP.70/MEN/2009. The Recreation Park, which covers an area of 39,900 Hectares, is home of various protected species such as turtles, sharks, whales, dolphins, and giant clam.

2.2.1 Rationale for the MPA designation

Pulau Pieh NMRP and surrounding waters of West Sumatra Province is an important area for coral reef ecosystems. This condition has led to establishment of the Recreation Park. Types of coral reefs that could be found in the area including fringing reefs and patch reef with sloping to steep contour (drop off).

In the early period of MPA establishment in 1993, coral reefs condition around Pieh Island reached 70% of live coral cover. This was the highest live coral cover recorded compared to others islands. A study in 1997, however, had revealed that live coral cover has declined to 35%. Such degraded condition was allegedly due to various causes such as destructive fishing practices and coral bleaching.

To prevent further declining of reef condition and to mitigate against the possibility of a catastrophic event (tsunami) on the west coast of West Sumatra, the region of Pieh Island which was later expanded by adding Bando Island, Water Island, Pandan Island, and Island Toran (Figure 6), was designated as a marine protected area. If an imaginary line drawn from the north end (Bando Island) to the south end (Toran Island), it will produce a straight line that runs to the west of the waters of West Sumatra. Moreover, the coral reefs along the imaginary straight line are expected to serve as a natural barrier to reduce impact from potential tsunami in the future.

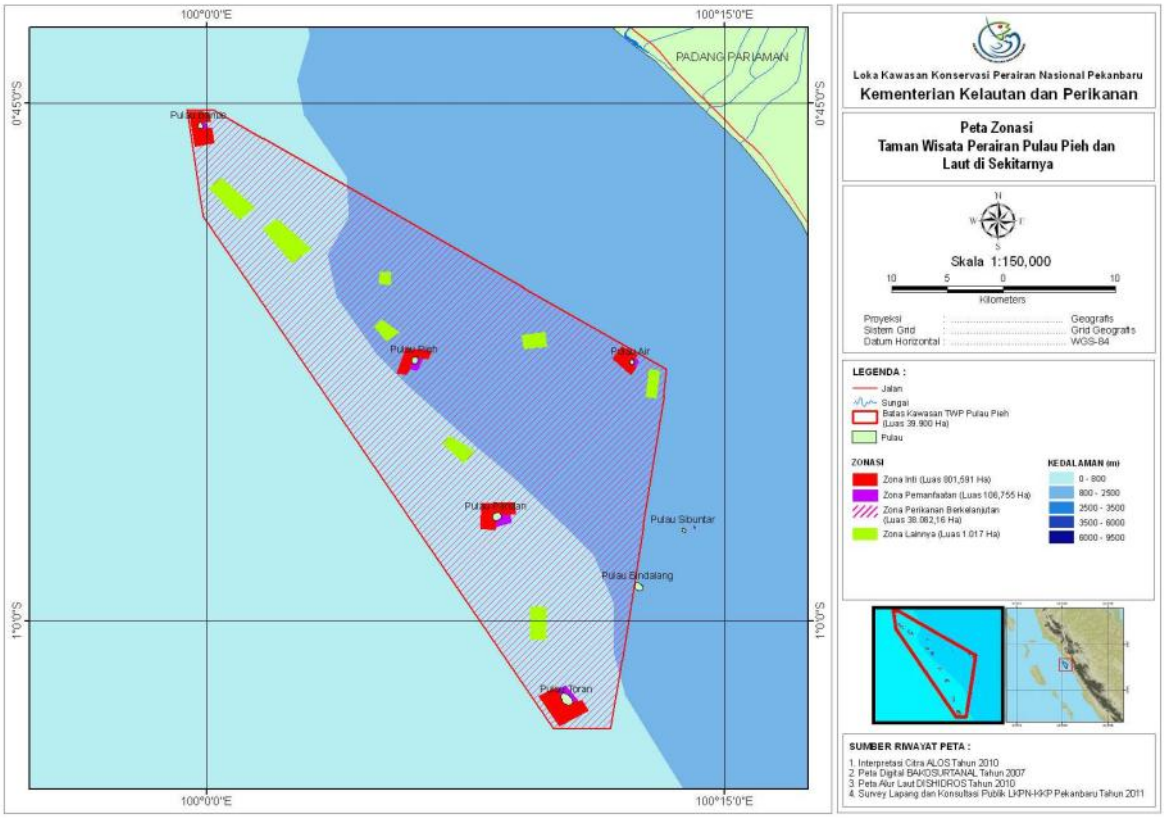


Figure 6. Pulau Pieh National Marine Recreation Park

2.2.2 Biophysical Setting

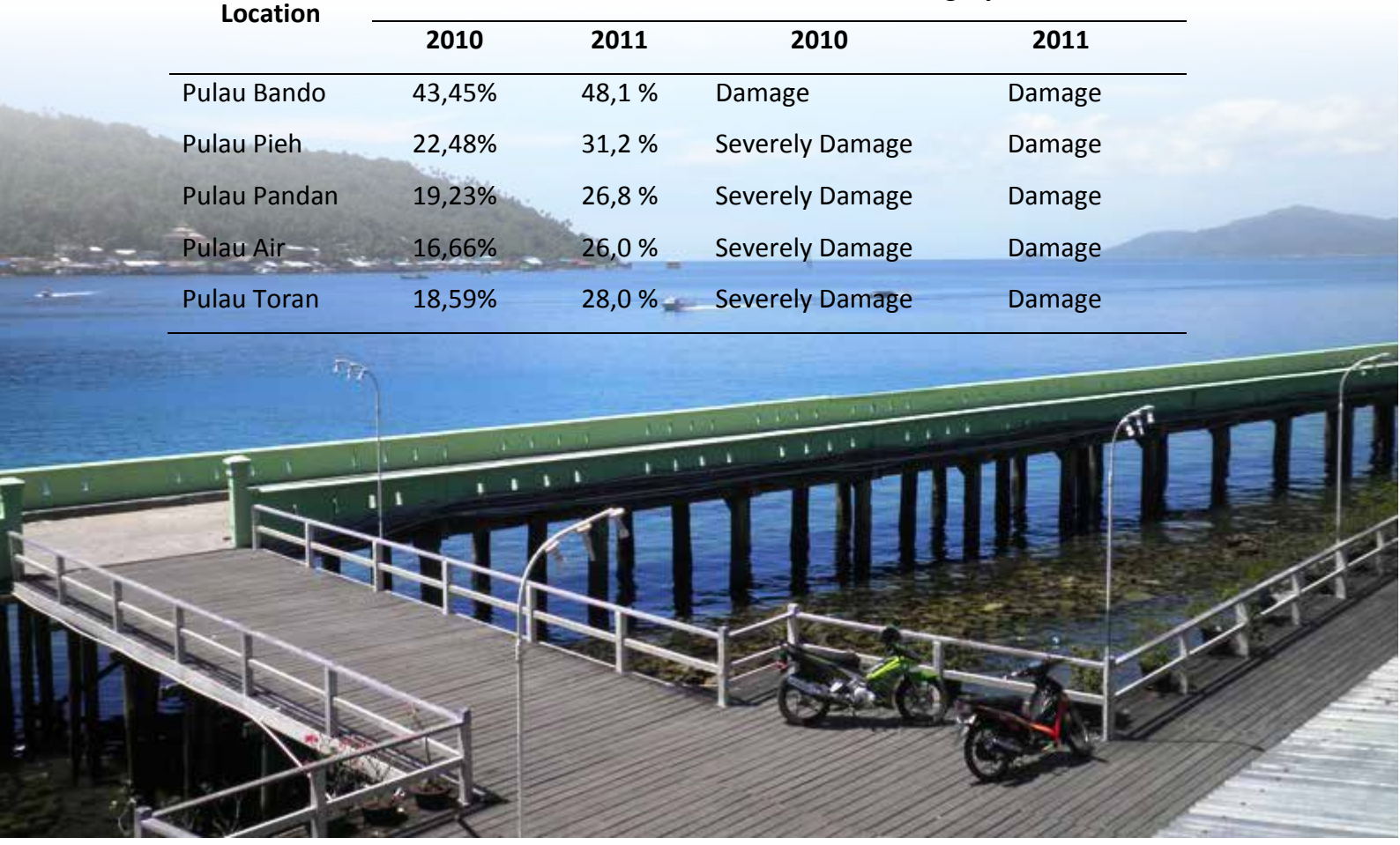
A baseline study on coral reef condition of Pulau Pieh NMRP was conducted in 2010 by Loka KKPN Pekanbaru (management authority of Pulau Pieh NMRP), in collaboration with local stakeholders in West Sumatra. The study found that the mean live coral cover in this area was 24.1%. According to the categories proposed by Gomez and Yap (1988), this finding suggests that coral reefs in the region were in severely damaged condition. This study was considered as baseline data (T_0) as a measure for management effectiveness of Pulau Pieh NMRP. Improvement of management effectiveness of Pulau Pieh NMRP and surrounding water is urgent since there are increasing pressures from fishing and destructive practice reported from the area. As comparison, a study in 1993 showed that the mean live coral cover in this area was by 70% and this was decreased rapidly to 35% as reported in a study in 1997.

Monitoring results of 2011 showed an increase of mean live coral cover to 32.22% compared to baseline data 2010 but still under 1997 study. Such improvement of live coral cover was probably due to increased local awareness on coral reef conservation. Increased local awareness is also has led to reduced pressures on coral reefs from fishing activities and other anthropogenic threats.

Before the designation of MPA, available data on live coral cover only concentrated in few areas. Since the available data was not sufficient for management purposes, the management unit had conducted an expanded survey to allow comparison of the condition of coral reef ecosystems from different parts around the island. The latest monitoring data of coral cover from survey in 2011 (Table 5; Figure 7) provides insight about condition of coral ecosystem in Pulau Pieh NMRP.

Table 5. Condition of live coral cover in Pulau Pieh NMRP based on survey in 2010 and 2011

Location	Live coral cover		Category	
	2010	2011	2010	2011
Pulau Bando	43,45%	48,1 %	Damage	Damage
Pulau Pieh	22,48%	31,2 %	Severely Damage	Damage
Pulau Pandan	19,23%	26,8 %	Severely Damage	Damage
Pulau Air	16,66%	26,0 %	Severely Damage	Damage
Pulau Toran	18,59%	28,0 %	Severely Damage	Damage



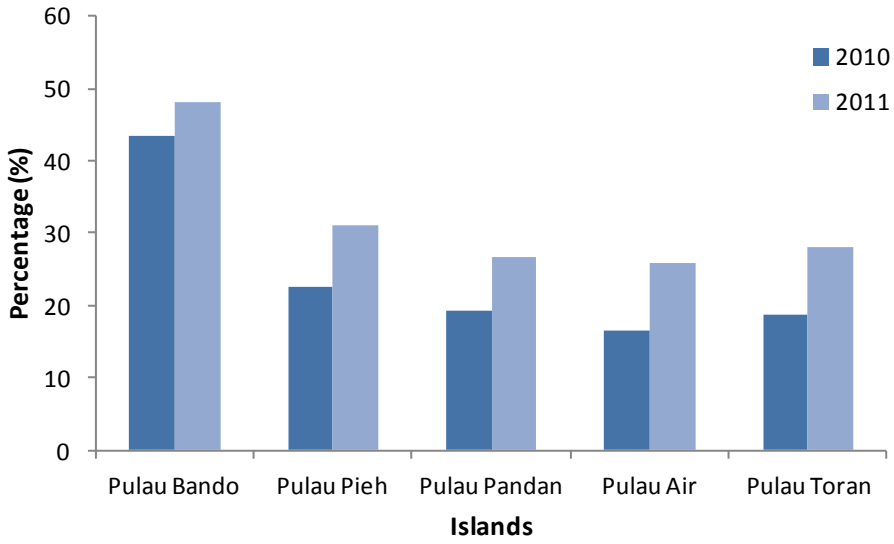


Figure 7. Percentage of coral cover in Pulau Pieh NMRP in 2010 and 2011 (LKKPN 2012)

2.2.3 Fisheries resources

The waters of Pulau Pieh NMRP are home of various reef fish species. Fishes found in this area can be categorized into three groups: major group species, target species and indicator species. Results of study to describe the distribution of reef fishes indicated that there were 32 families that comprised of 170 species. The most abundant species were *Acanthurus lineatus, Centropyge eibli, Ctenochaetus binotatus, Ctenochaetus striatus*, and *Gomphosus varius*.

Latest study in 2011 reported the mean abundance of 15,785 ind/ha. *Odonus niger* was the most abundant species, with population reaching 31.160 ind/ha, followed by *Cirrilabrus cyanopleura* (1,912 ind/ha) and *Ctenochaetus striatus* (640 ind/ha).

The study was also conducted to identify the abundance of several economically important fish species at deeper water (10 m). Results showed that mean abundance of snapper (Lutjanidae) was 238 ind/ha, groupers (Serranidae) 214 ind/ha and yellow tail (Caesionidae) 1,291 ind/ha. Other species that were also reported from the area were Mackerel (*Rastreliger kanagurta*), Giant Trevally (*Caranx melampygus* and *Carangoides bajad*). One reef shark species, the Black Tip Reef Shark (*Carcharinus melanopterus*) was encountered as well on Toran Island, Pandan and Pieh.

Besides coral reefs, the waters in the region serve as feeding grounds of some charismatic aquatic species such as dolphins and whale sharks. Data and information was obtained from fishermen information and direct observation by officers of Loka KKPN Pekanbaru. In addition, some beaches of the islands have been reported as sea turtle nesting sites, and the reefs are home and spawning ground of reef fishes, especially grouper. Another important marine biota that can be found in the area are large giant clams (*Tridacna* spp.), large shellfish (size > 20 cm), lola (*Trochus niloticus*), and lobster. There is also a protected bird species which lives in the area, i.e. the white-bellied sea eagle (*Haliaeetus leucogaster*).

2.2.4 Social and Cultural Setting

In West Sumatra Province, local communities have long been practicing traditional approach of natural resource management called Lubuk Larangan (prohibited [river] pool). This practice is carried out as a form of local public awareness of the existence of water resource, especially rivers as habitat of one of the endemic species, the Gariang (*Tor* sp.).

Successful application of local wisdom in inland waters cannot be separated from the role of customary regulations which is applied in the utilization of resources in society. In its application, the customary laws or regulations are applied more effectively than the laws and regulations made by the government; in terms of the application of the use of inland waters, such as site selection and periodic closures mechanism.

In addition to local knowledge by local communities in the management of inland waters, there are also customary practices on West Sumatra coasts which apply to the utilization and management of coastal resources. They are as follows.

1. Tuo Pasie: person(s) who are entrusted by community to take responsibility and look after the preservation of marine natural resource, including coastal ecosystem and coastal community behavior. However, increasing economic demand for income by coastal communities, and increasing flow of information and technology, has made role of Tuo Pasie becoming obsolete.

2. Prohibition to throw rotten fish to the sea which will make the sea being cursed and fish do not want to come close to the shore.

3. The fateful day: coastal communities believe that Friday afternoon and Tuesday is a bad day for fishing or going to the sea, so it is prohibited for everyone to go to the sea. The belief is still held by some coastal communities until now.

4. Malimau Pasie Bala, which is a series of ceremonies to treat or clean up the beach and waters because the fish are not willing to get closer to the catchment area and make catches much reduced.

5. Prohibition to catch marine species such as whale, dolphin, marine turtle and manta.

2.2.5 Issues of Pulau Pieh NMRP management

There are several major issues that influence effective management of Pulau Pieh NMRP. Many are rooted from factors external to management unit. However, the management unit itself still facing challenges of implementing monitoring and surveillance.

A. Coral reef degradation

Coral reef is one of the major habitats/ecosystems in Pulau Pieh. The condition of coral reef affects many aspects of NMRP ecosystem and its potential for tourism. The designation of Pulau Pieh as Recreation Park implies that the management activities will be focused on preserving its beauty, aesthetic condition, and role for tourist attractions.

B. Exploitation of protected marine species

Pulau Pieh and its surrounding waters are home for several protected marine species. One of them is turtle (e.g. green sea turtle, *Chelonia mydas*), and many beaches in the area have been reported as turtle nesting location. One major problem facing in the area is illegal collection and trade of turtle eggs due to their high price. Lack of surveillance and poor enforcement have made the eggs are continuously exploited regardless to its protection status. If efforts to curb this illegal activity are not established, Pulau Pieh NMRP will certainly lose its main asset and potential as a tourist park.

C. Conversion of island's habitats

There are five islands within the area of Pulau Pieh NMRP, i.e. Bando Island, Pieh Island, Toran Island, Water Island, and Pandan Island. Since long time ago, these islands have been managed by their owners to produce coconuts which grow naturally along the edge of the islands. Recently, the owners in Bando and Water islands want to get better harvest, and they do so by converting the forest in the inner parts of the islands into coconut plantations. These activities certainly would threaten the islands' ecosystems and biodiversity since the forest conversion will damage and causing loss of so much island biodiversity. Island forest ecosystem is one of the potentials and attractiveness of Pulau Pieh NMRP, besides serving as a 'backbone' for the existence of the island itself.

D. Natural disaster

In addition to threats from human activities, other threats to the sustainability of Pulau Pieh NMRP are coming from natural factors such as climate change as well as the natural disasters, especially frequent earthquakes that hit west coast of Sumatra. In recent years there were two relatively large scale earthquakes, in 2007 and in 2009. The one which struck in 2009 even had led to the fracture of the bottom of the waters close to Pulau Pieh NMRP.

E. Beach erosion

Beach erosion, which has eroded coastal plain, is a major factor that needs attention when managing Pulau Pieh NMRP. Coastal erosion caused by waves and tsunami in 2010 had led to the erosion of coastal land that threatens to sink small islands in the Pulau Pieh NMRP. The threat could be minimized by maintaining coral reefs and coastal vegetation in the area to reduce wave energy that hit the shore.

F. Infrastructure limitation for MPA management

Management of Pulau Pieh NMRP needs infrastructure that can support ongoing activities in a sustainable manner. Infrastructure needed is not only for tourists, but also for the management authority itself to support monitoring and enforcement activities. The most needed facilities and supporting infrastructure include ship superintendent and post guards.

G. Community awareness

Destructive fishing activities reported in the area are mainly caused by lack of understanding and awareness among local communities and fishers about the benefits of conservation and sustainable use of marine resources. The ongoing unsustainable fishing practices have led to the decrease of catch considerably.

To make it worst, fishers are also collecting turtle eggs. Myth that turtle eggs are good for health and having aphrodisiac effect have been created high market demand among local society. If this issue is not addressed immediately the existence of the already under pressure coral reefs and sea turtles in Pulau Pieh NMRP will further be threatened.

2.2.6 Management plan and zoning plan of Pulau Pieh NMRP

Development of Pulau Pieh NMRP zoning was undertaken based on inputs from the public, especially fishers from Padang City, Pariaman City and Padang Pariaman district who fish every day in or around the area. Inputs from the community include fishing activities data, such as fishing gears and catches, and the presence of charismatic species (such as whale sharks, whales, dolphins, turtles, etc.) that they had encountered during fishing around the region. These inputs were then plotted into a map to indicate their geographical distribution.

Plotting the activities on a map helps portraying zones that were being planned to be established in the Recreation Park, in particular sustainable fisheries zone and other use zones. For the core zone, it was determined based on primary data that have been taken previously coupled with information from fishers about fish spawning areas or places where fishers once or often find their adults and juvenile, especially the economic important species.

As a result, the management plan of Pulau Pieh NMRP has been achieved through the following strategies:

1) Strengthening Institutional Capacity, through capacity building, institutional development partnerships, infrastructure and facilities, area management, organizational development, establishment of networks and monitoring and evaluation.

2) Strengthening Resource Management, through the protection of habitat and fish populations, coral reef rehabilitation, research, nature tourism and services, utilization of fish resources, supervision and control as well as monitoring and evaluation.
3) Supervision, Control and Law Enforcement, through rules setting, and integrated routine patrol, and law enforcement efforts both interpretive and repressive.
4) Strengthening Social, Economic, and Culture of Communities, through social and economic development, community development, socialization, education, publication and monitoring.
5) Community awareness, through the dissemination and counseling, and
6) Promotion, through exhibitions and public service announcements.

As indicated, one part of strategy number 2 is directed to improve fisheries resources in the area; therefore it could be assumed that the MPA management in this area can be considered as one essential tool for sustainable fisheries management within WPP 572 (which covers eastern part of Indian Ocean, i.e. west coast of Sumatra, and Sunda Strait).

2.3 Sabang District MPA and Pulau Pieh NMRP in National Fisheries Management Perspective

Government of Indonesia has designated eleven fisheries management region (wilayah pengelolaan perikanan/WPP) covering all existing Indonesian MPAs (Figure 7). Sabang District MPA and Pulau Pieh NMRP are located within region number 572 (which cover all west coast of Sumatra). Under WPP 572 there are 138 fishing ports with fish production potential approximately 565.300 tons/year, dominated by big and small pelagic and demersal fish.

Assessment on the status of ecosystem for the region indicated that major environmental problems are habitat degradation (sea grass, coral reef, and estuary) and climate change impacts (EAFM-Indonesia, 2012). This environmental degradation problem is exacerbated by destructive fishing practice and over capacity for fishing.

To support sustainable fisheries, the Indonesian MPA system and designation criteria are in accordance with objectives of sustainable fisheries. Such arrangement is critical since some people are sometime putting dichotomy differentiating MPA management from fisheries

management. For example, IUCN definition of MPA is often used 'differently' in contrast with the definition and objective of fish refugia for sustainable fisheries management (UNEP/GEF, 2010). It is also perceived by stakeholders that the designation of MPA is mainly based on biodiversity concern, uniqueness of the location, and representativeness rather than fisheries. However, is should be emphasized here that the MPA system under Indonesia's policies covers both biodiversity concern and fisheries objective.

Under the Government Regulation No. 60/2007 on Conservation of Fish Resource, the principles of MPA designation and management include prevention of overfishing and development of environmentally friendly fishing gear, fishing methods and aquaculture. Ecosystem conservation is undertaken to protect fish habitats and populations, and to rehabilitate fish habitats and populations.

Moreover, the locations for MPA is selected based on the criteria or consideration of ecological and fisheries interests that include biodiversity, naturalness, ecological relevance, representativeness, uniqueness, productivity, fish migratory areas, habitat of rare fish, fish spawning area, and nursing areas (WCPA-IUCN, 2008).

In this regards, it is considered that Indonesian MPA system contribute significantly to the achievement of sustainable fisheries in Indonesia. This is also in-line and consistent with guidelines developed by FAO to integrate MPA management with fisheries management, and vice versa. In more practical way, FAO also recommends that during the initiation of MPA, it should:

- ensure that fisheries are taken into consideration and fisheries objectives incorporated
- integrate fisheries management using existing legal basis of MPA
- increase collaboration and coordination
- involve fisheries stakeholder in MPA planning and implementation.
- include fisheries data and information when establishing MPAs.

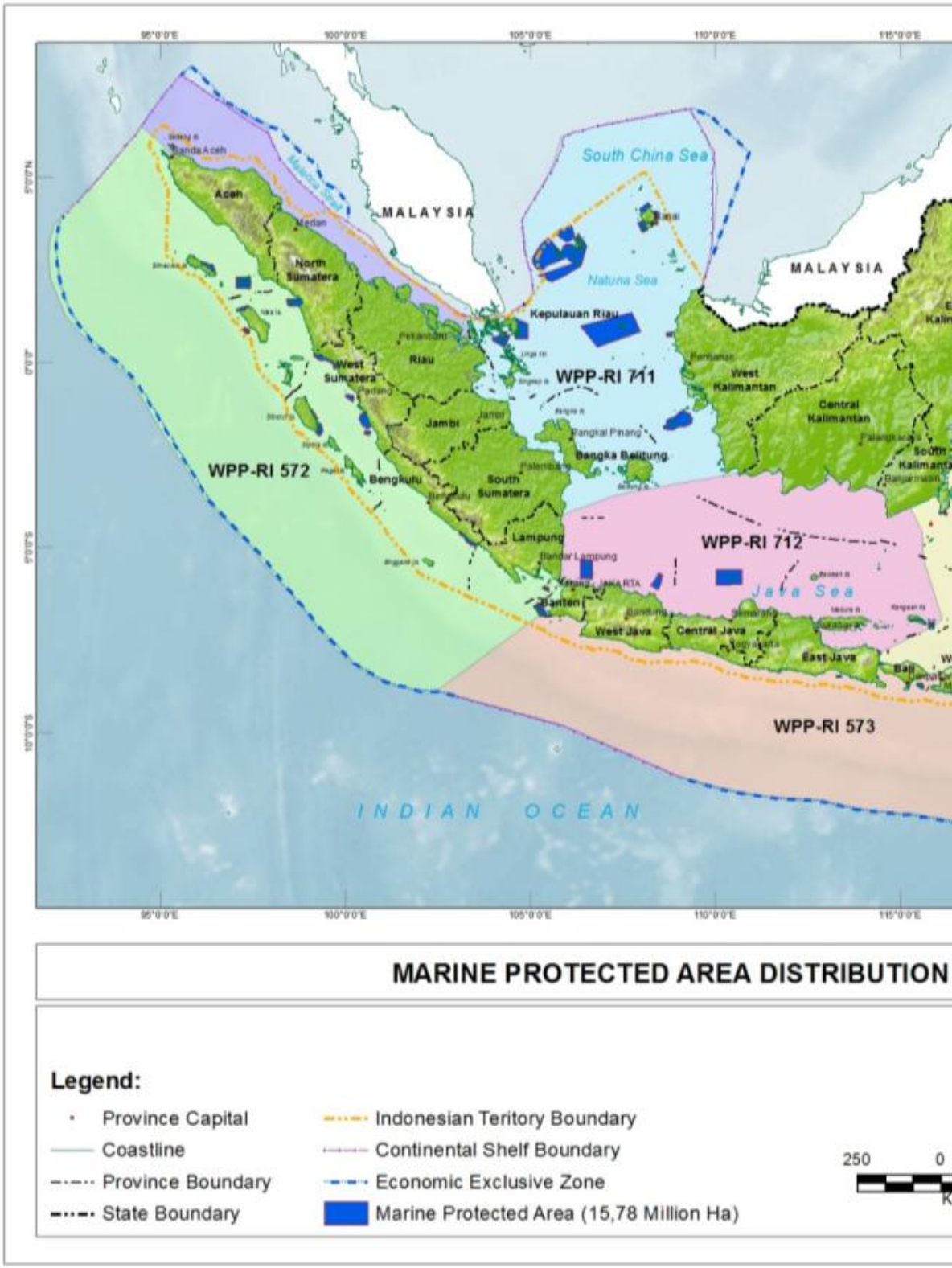
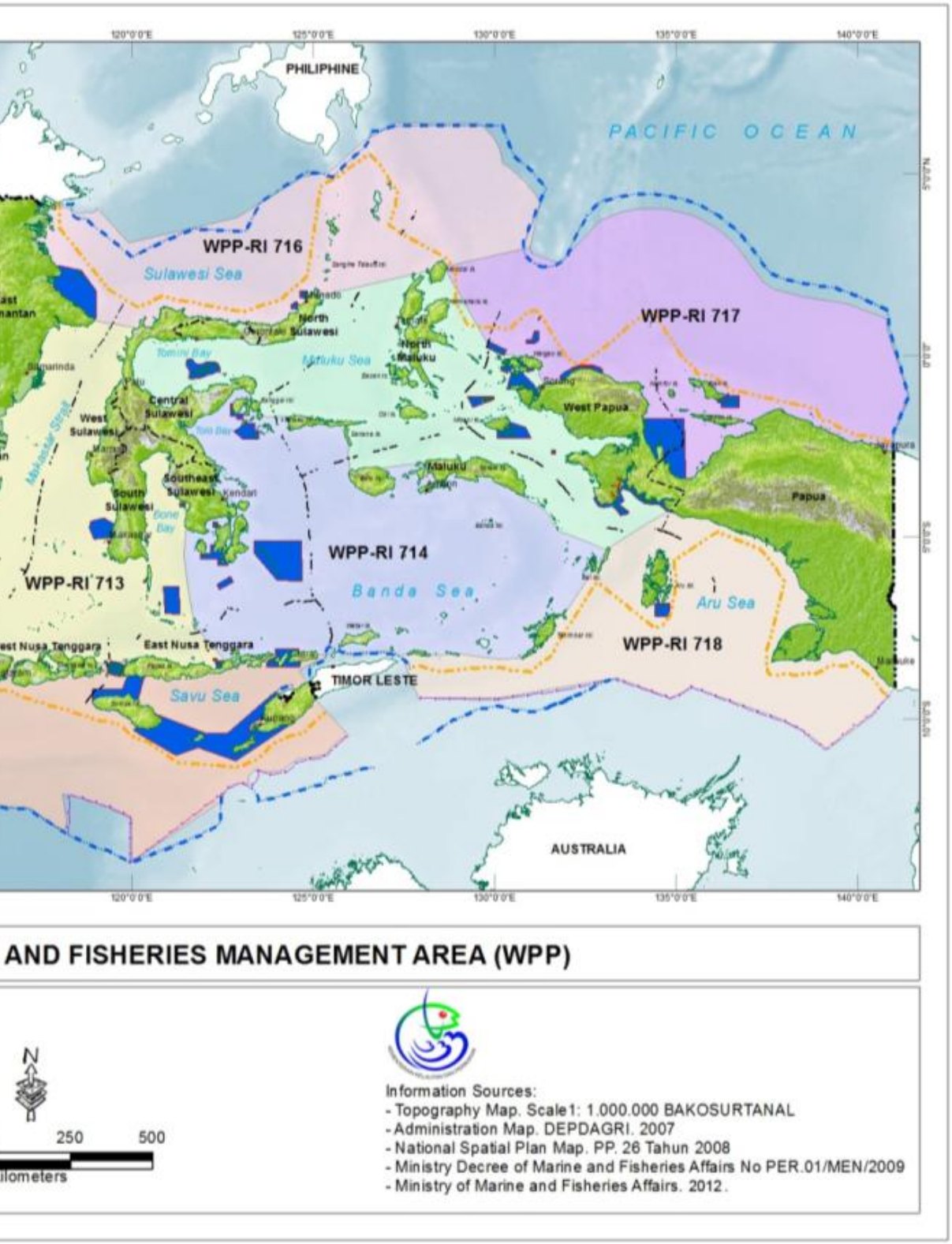


Figure 8. Distribution of Indonesian MPA v



within Fisheries Management Area (WPP).

3. MARINE PROTECTED AREA MANAGEMENT EFFECTIVENESS SCORE CARD

Management effectiveness of MPA is defined as "(the level) to which management efforts may produce positive results or impacts both for the biological resources and local communities in a given conservation area." Hence the Ministry of Marine Affairs and Fisheries (MMAF) as the agency responsible for marine sector in Indonesia needs to develop an instrument that able to measure effectiveness level of the establishment and management of MPAs in Indonesia. Furthermore, this instrument should be used as a national standard and implemented in all MPAs across Indonesia.

To address this issue, the Directorate of Marine and Aquatic Resources Conservation (KKJI) of MMAF had developed a document entitled Technical Guidelines for Evaluating the Management Effectiveness of Aquatic, Coasts and Small Islands Conservation Areas (henceforth 'E-KKP3K Technical Guidelines'). The E-KKP3K Technical Guidelines is a tool to measure the effectiveness of MPA establishment and management which can also be used by MPA managers to benchmark their MPAs towards effective management.

The Technical Guidelines has been officially endorsed through the Directorate General of Marine, Coastal and Small Islands Decree No. KEP.44/KP3K/2012. To enable full utilization of the Technical Guidelines, MMAF and its partners are currently developing a series of more detailed manuals which refer to the criteria, questions and verification tools governed by the Guidelines. Besides for measuring management effectiveness, it can also be used for identifying and planning for activities such as development of management and zoning plans, human resource, and sustainable financing.

The development of the E-KKP3K Technical Guidelines involved literature review in order to better understand the concepts relating to the outcomes of management activities and the objectives of conservation. Moreover, the strengths and weaknesses of existing MPA management effectiveness measurement tools were also considered. The evaluation of MPA management effectiveness refers to framework for MPA Management Cycle as depicted in Figure 1, which includes logical steps as follow: (1) problems identification, (2)

program design and planning, (3) implementation of activities with associated monitoring & (formative) evaluation , and (4) evaluation to assess implementation of activities' outcomes and/or impacts. The E-KKP3K Technical Guidelines adopts a perspective that effective management of MPA is a transformative process whereby activities (inputs, processes and outputs) would result with positive biodiversity outcomes which in turn would produce positive impacts on local communities associated with the MPA in question.

The evaluation of MPA management effectiveness refers to Minister of Marine Affairs and Fisheries Regulations Number PER.02/MEN/2009 on the Procedures for Establishing Marine Protected Areas and Number PER.30/MEN/2010 on Management and Zoning Plans of Marine Protected Areas. Both regulations are reflected in the E-KKP3K Technical Guidelines, which rely on a color-coded ranking system to distinguish different levels of management effectiveness, from initiation stage (red) to self-reliant stage (gold), as presented in Table 6. Each level has a set of criteria that must be fulfilled by MPA management authority. To ensure the provided responses are genuine and reflecting real situation in the field, each answer must be accompanied with proof or evidence as verification. Besides for assessment at site level, the Technical Guidelines is also used for assessment at national level, using 17 general criteria, to classify management performance and effectiveness of MPAs throughout Indonesia.

The first three levels of MPA management effectiveness—red, yellow and green—refer to stages in which MPA managers must fulfill basic prerequisites such as obtaining legal documents, setting up infrastructure and facilities, and building capacity of human resource. Moving up the ranking, at blue level MPAs are expected to have achieved some conservation targets, whereas MPAs that have attained gold level should contribute positively to aspects pertinent to the MPA such as area's biological resource, and socio-economic and socio-cultural.

Progress towards the green level of MPA management can be achieved sequentially, whereby each color band is a prerequisite to going up to the next one, e.g. from red to yellow, and from yellow to green. For the blue and gold levels, however, the criteria do not have to be fulfilled sequentially as they depend on the unique conditions of individual MPAs.

The E-KKP3K Technical Guidelines have been field-tested in several areas by KKJI with collaboration with members of USAID/MPAG consortium. Places where the tests were conducted are Savu Sea National Marine Park, Anambas National Marine Recreation Park, Gili Matra National Marine Recreation Park, Nusa Penida District MPA, Maluku Tenggara District MPA, Batang District MPA, Pesisir Selatan District MPA, Sukabumi Coastal Park, Raja Ampat District MPA, Pulau Pieh National Marine Recreation Park, Aru Tenggara Marine Reserve, and Lombok Timur District MPA. For detailed content and score card of the E-KKP3K Technical Guidelines readers should refer to Decree of Director General of Marine, Coasts and Small Islands Number KEP.44/KP4K/2012 (available from http://kkji.kp3k.kkp.go.id).

Table 6. Criteria for evaluating Indonesian MPA management effectiveness

Level/Stage		**Criteria**	
Red (1)	**Conservation Area Initiated**	1	Initiative proposal
		2	Area identification and inventory
		3	Reservation of conservation area
Yellow (2)	**Conservation Area Established**	4	Management organizational unit and personnel
		5	Management and zoning plans
		6	Facilities and infrastructure to support management
		7	Management funding support
Green (3)	**Conservation Area Managed Minimally**	8	Approval of management and zoning plans
		9	Management standard operating procedures
		10	Implementation of management and zoning plans
		11	Designation of Aquatic Conservation Area
Blue (4)	**Conservation Area Managed Optimally**	12	Boundary marking
		13	Institutionalization

		14	Resource management
		15	Socio-economic and cultural management
Gold (5)	**Self-Reliant Conservation Area**	16	Improving community welfare
		17	Sustainable funding

4. WORKSHOP ON MPA MANAGEMENT EFFECTIVENESS

Assessments of management effectiveness of MPAs piloted for this project were conducted in Sabang District MPA and Pulau Pieh NMRP. The assessments were conducted through two separate 2-day workshops, one was held in Banda Aceh (for Sabang District MPA) and one was held in Padang City (for Pulau Pieh NMRP), respectively. The first day of the workshop was aimed to deliver training to participants on how to use the MPA management effectiveness score card; and in the second day, participants conduct assessment of management effectiveness of their respective MPA.

4.1 Workshop for Sabang District MPA

Workshop to assess management effectiveness of Sabang District MPA was held in capital of Aceh Province, Banda Aceh, and taking place in Paviliun Seulawah Hotel on 12-13 June 2013. A total of 30 participants and 6 facilitators attended the workshop (compete list of the participants and facilitators is in Annex 1). Besides managers of Sabang District MPA, participants of the workshop were managers of neighboring MPAs in Northern Aceh such as Aceh Besar MPA, Aceh Jaya MPA, and Simeulue MPA, and local government agencies representatives. They had been able to attend with co-funding support from the Directorate of Marine and Aquatic Resources Conservation (KKJI) of MMAF.

The workshop was officially opened by the Head of Provincial Marine Affairs and Fisheries Office of Aceh Province. It was continued next with sessions to explain details of the E-KKP3K Technical Guidelines and the management effectiveness score card by Drs. Riyanto Basuki (Deputy Director for Area Conservation, Directorate KKJI – MMAF) and Mr. M. Khazali (Conservation International). For the rest of the day, the workshop was then continued with discussion on how to use the management effectiveness score card in each MPA (i.e. Sabang, Simeulue, Aceh Besar and Aceh Jaya).

The second day of the workshop was started by a presentation on three main aspects of the MPA management effectiveness measures (governance, natural resources, and socio-

economic and culture) which were delivered by Rakhmat Dirgantara (FFI), Irfan Yulianto (WCS), and Arisetiarso Soemodinoto (TNC), respectively. The workshop was then continued with group discussion to assess the management effectiveness of each MPA. The participants were divided into 4 groups which represent the four MPAs. Group 1 (Sabang District MPA) was facilitated by Ahmad Mukminin (WCS); group 2 (Simeulue MPA) facilitated by Rakhmat Dirgantara (FFI); group 3 (Aceh Jaya MPA) facilitated by Irfan Yulianto (WCS); and group 4 (Aceh Besar MPA) facilitated by Arisetiarso Soemodinoto (TNC).

Opening session

Irfan Yulianto (WCS) during presentation

Group discussion

Group discussion

Arisetiarso Soemodinoto from TNC (left) and Ahmad Mukminin from WCS during discussion

Workshop participants

4.2 Workshop for Pulau Pieh NMRP

Workshop to assess management effectiveness of Pulau Pieh NMRP was held in Padang, the capital of West Sumatra Province, and taking place in Premier Basko Hotel on 15-16 July 2013. The workshop was attended by 28 participants and 5 facilitators (complete list of participants and facilitator is in Annex 2). This event was also participated by MPA managers and representatives of local government agencies of several neighboring districts, with co-funding support from the Directorate for Conservation of Area and Fish Species of MMAF. The participants who involved in this workshop were from Directorate of Fisheries Resources of MMAF, West Sumatra Province, Marine and Fisheries Office of Kepulauan Mentawai District, Marine Affairs and Fisheries Office of Pesisir Selatan District, Marine Affairs and Fisheries Office of Pariaman City, Marine Affairs and Fisheries Office of Padang City, Marine Affairs and Fisheries Office of Padang Pariaman District, Marine Affairs and Fisheries Office of Pasaman Barat District, LKKPN Pekanbaru, Balai Pengelolaan Sumberdaya Pesisir dan Laut (BPSPL – Office of Coastal and Marine Resources Management) Padang, and Bung Hatta University.

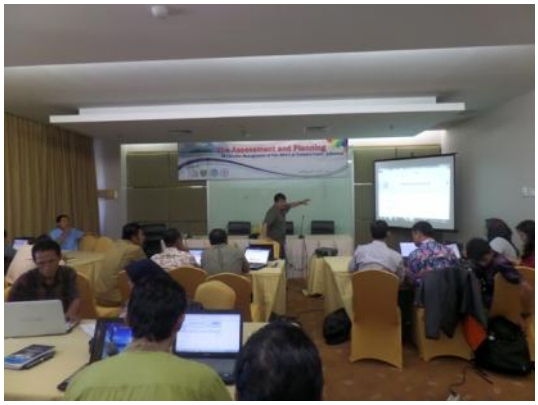
The workshop was officially opened by Dr. Ahsanal Kasasiah, Deputy Director for Network, Data and Information of Conservation, Directorate KKJI, MMAF. Subsequently, the Head of Provincial Marine Affairs and Fisheries Office of West Sumatra Province delivered a talk on

the development and management of MPAs in West Sumatra, followed by a presentation on the support from BOBLME project on the MPA development in the region from Mrs. Erni Wijayanti, Head of Sub-Directorate of Fisheries Resources of Territorial and Islands Waters of MMAF. The workshop sessions were started with presentation to explain E-KKP3K Technical Guidelines and the management effectiveness score card by Mrs. Nilfa Rasyid (Head of Section of Conservation Area Design of Directorate KKJI, MMAF). Then, presentations on three main aspects of the MPA management effectiveness measures (governance, natural resources, and socio-economic and culture) were delivered by M. Khazali (CI), Yudi Herdiana (WCS), and Arisetiarso Soemodinoto (TNC), respectively.

In the second day, the workshop was continued with group discussion to assess the management effectiveness of each MPA. The participants were divided into 6 groups which represent the Pulau Pieh NMRP and district governments, Kepulauan Mentawai District, Pesisir Selatan District, Pariaman City, Padang Pariaman District, and Pasaman Barat District. The group discussion was facilitated by M. Khazali (CI), Yudi Herdiana (WCS), Arisetiarso Soemodinoto (TNC), and Teguh Satria (MMAF).

Opening session by Dr. Ahsanal Kasasiah (second from right)

Participants during class presentation



Arisetiarso Soemodinoto (TNC) during presentation

M. Khazali (CI) during presentation

Group discussion

Workshop participants

4.3 National Workshop

As the final step of the monitoring and evaluation of management effectiveness of Sabang District MPA and Pulau Pieh NMRP, a national workshop was held on 10th of December 2013 at the Pullman Hotel, Jakarta. The workshop was aimed to gather inputs from nationwide stakeholders to the results on MPA management effectiveness, as well as inputs to the MPA management effectiveness tool (E-KKP3K) in general. The workshop was attended by 41 participants, representatives from the MMAF, district governmnts, MPA management unit, and NGO (complete list of participants is in Annex 3).

The workshop was officially opened by Dr. Ahsanal Kasasiah, Deputy Director for Network, Data and Information of Conservation, Directorate KKJI, MMAF, and followed by a

presentation on the MMAF's strategy on the achieving 20 million ha of MPA by 2020 and effectively managed 4,5 million ha of MPAs by 2014. The workshop was continued to (i) the presentation on the BOBLME project and its support on the MPA development in the region by Mr. Hari Chrystijanto from the Directorate of Fisheries Resources of MMAF; and (ii) presentation on the E-KKP3K tool (by Dr. Arisetiarso Soemodinoto – TNC), (iii) presentation on the assessment result of Pulau Pieh NMRP (by M. Khazali - CI), and (i) presentation on the assessment result of Sabang District MPA (by Yudi Herdiana – WCS). In the second session, the workshop was continued with open discussion among the participants and gave inputs for improvement to asssesment results and project report.

Workshop participants

Dr. Ahsanal Kasasiah (MMAF) during presentation

Mr. Hari Chrystijanto (MMAF) during presentation

M. Khazali (CI) during presentation

Workshop participants

Workshop participants

5. MANAGEMENT EFFECTIVENESS OF SABANG DISTRICT MPA AND PULAU PIEH NATIONAL MARINE RECREATION PARK

5.1 Management Effectiveness of Sabang District MPA

5.1.1 Management Effectiveness Status

The status of management effectiveness of Sabang District MPA was at 100% yellow level with some management activities have already been carried out at the green and blue level, achieving 52% and 14%, respectively. The assessment results are presented in Table 9 below:

Table 7. Assessment results of management effectiveness of Sabang District MPA

Ranking	No. of Question	No. of YES answer	Percentage
Red	8	8	100%
Yellow	11	11	100%
Green	21	11	52%
Blue	28	4	14%
Gold	6	0	0%

Achievement of yellow level includes the following aspects:

1. Management Unit of MPA

   The management unit of Sabang District MPA has been legalized through the Head of Marine Affairs and Fisheries Office Decree Number 523/80/2012 which put it under coordination of Marine Affairs and Fisheries Office of Sabang City. It consists of managers representing Marine Affairs and Fisheries Office, Head of Panglima Laot (local customary institution) of Sabang City, Ie Meulee village, and Anoi Itam village. Villagers from two villages are also support the management unit voluntarily under coordination of their respective Panglima Laot. In terms of staff capacity to manage MPA, members of the management unit have been trained on basic MPA management (MPA101).

2. Final draft of management plan

   The making of Sabang District MPA's Management and Zoning Plan document was initiated in July 2010, with the formation of a working group. The working group did ecological and socio-economic studies to describe ecological and socio-economic condition of local people living in and adjacent to the MPA, and identifying existing issues and threats that relevant to MPA management. Series of public consultation meetings both at community level and district level were carried out to gather inputs for the perfection of management and zoning plan.

3. Facilities and infrastructure

   The current existing facilities in Sabang District MPA is a well-equipped field office; and the existing basic infrastructure to support management implementation are survey equipment (for monitoring) and surveillance equipment (boat, binoculars, communication devices, four wheeled transportation).

4. Financial support

   Budget for office operation and some management implementation in Sabang District MPA is currently fully provided via the municipal budget.

Achievement of green level includes the following aspects:

1. Qualification of the members of management unit to support basic MPA management

   Most of the members of management unit have been trained on basic MPA management (MPA101) and monitoring-surveillance methods.

2. Effort to initiate partnerships with stakeholders

   An initiative to develop partnership with stakeholders was carried out through collaborative patrol and surveillance program, involving participants from local communities, Police, and the Navy.

3. Adequate equipment for office operation

   Equipment to support office operation such as furniture, computers, communication devices, office supplies, and filing cabinets, are existed.

4. Financial support and planning

   Financial plan for Sabang District MPA is incorporated in the annual work plan of the management and zoning plan document. Most of the activities are supported by the municipal budget, while other activities such as regular monitoring are supported by Wildlife Conservation Society and Syiah Kuala University.Final management and zoning plan document of Sabang District MPA has been submitted for approval to the Ministry of Marine Affairs and Fisheries on June 2011.

5. Baseline survey to collect ecological and socio-economic data has been conducted with support from Wildlife Conservation Society.

6. Activities to utilize respective zones for capture fisheries and tourism have been taking place and follow direction outlined in the zoning plan.

7. The MPA has been proposed to be officially designated by the Minister of Marine Affairs and Fisheries on January 2013.

Achievement of blue level includes the following aspects:

1. Strengthening of local institutions

   The Marine Affairs and Fisheries Office of Sabang City has been collaborated with Wildlife Conservation Society (WCS) and PUGAR Foundation since 2010 to facilitate improvement of capacity of Panglima Laot institution to support MPA management. Activities include facilitating better communication between Panglima Laot institutions with government agencies to support the implementation of customary law within the MPA.

2. Law enforcement

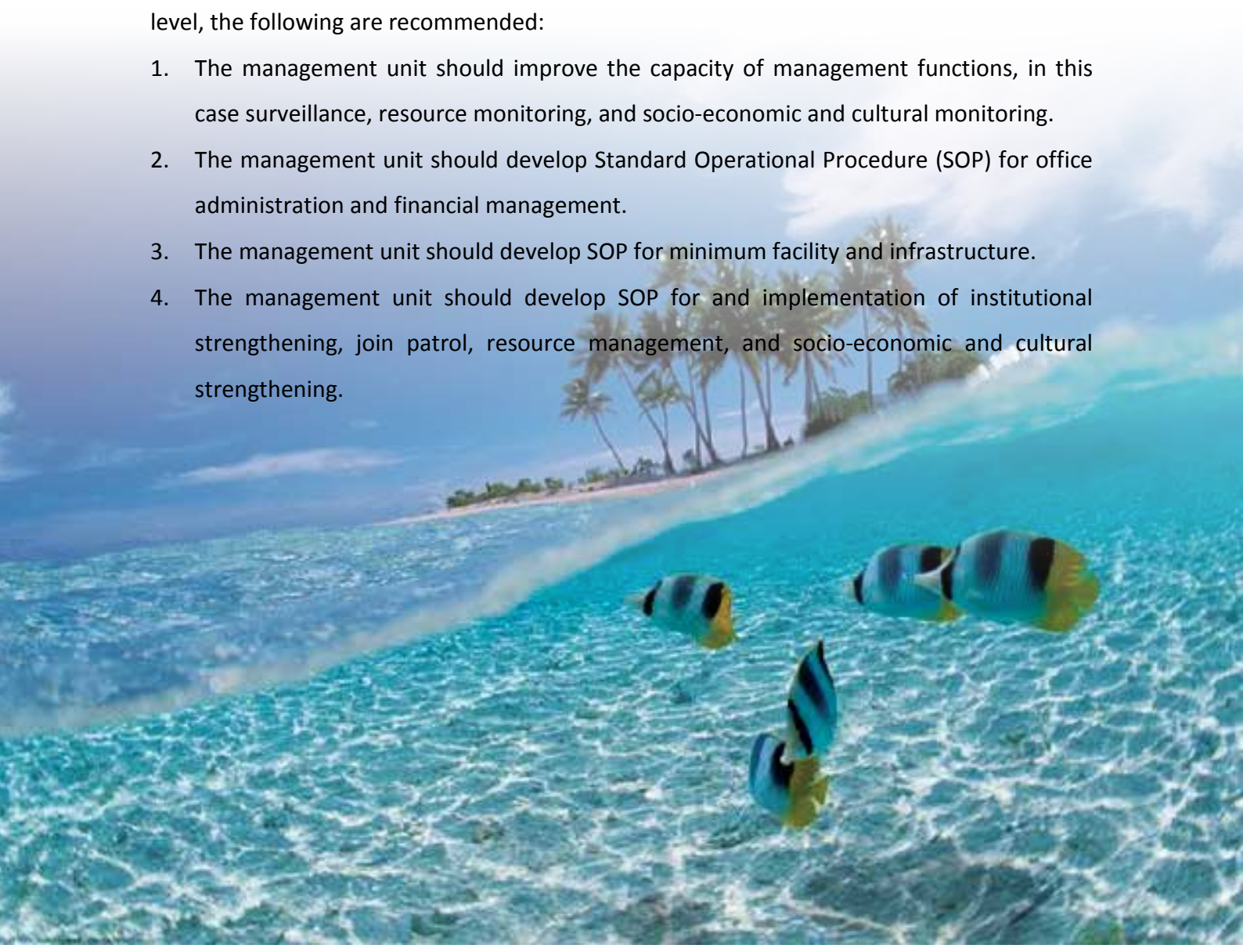
   Sabang District MPA employs customary law in implementing enforcement within the MPA. Several customary approaches in processing violation within the MPA have been carried out with facilitation from local government agencies and WCS.

3. The Sabang District MPA has been acknowledged and included in the Weh Island marine spatial plan.

5.1.2 Recommendation to improve management effectiveness of Sabang District MPA

To improve management effectiveness level of Sabang District MPA towards 100% of green level, the following are recommended:

1. The management unit should improve the capacity of management functions, in this case surveillance, resource monitoring, and socio-economic and cultural monitoring.
2. The management unit should develop Standard Operational Procedure (SOP) for office administration and financial management.
3. The management unit should develop SOP for minimum facility and infrastructure.
4. The management unit should develop SOP for and implementation of institutional strengthening, join patrol, resource management, and socio-economic and cultural strengthening.



5.2 Management Effectiveness of Pulau Pieh NMRP

5.2.1 Effective Management Status

The status of management effectiveness of Pulau Pieh NMRP was at 100% yellow level with some management activities have already been executed at the green and blue level, achieving 43% and 10%, respectively. Results of management effectiveness assessment are presented in Table 10 below:

Table 8. Assessment results of MPA management effectiveness of Pulau Pieh NMRP

Ranking	No. of Question	No. of YES answer	Percentage
Red	8	8	100%
Yellow	11	11	100%
Green	21	12	43%
Blue	28	4	8%
Gold	6	0	0%

Achievement of yellow level includes the following aspects:

1. Management Unit of MPA

   The Loka KKPN (Kawasan Konservasi Perairan Nasional) Pekanbaru was appointed as management authority for the Pulau Pieh NMRP by the Minister of Marine Affairs and Fisheries Regulation No. 24-2011 on the Organization and Working Procedures of Technical Unit of KKPN, based in Pekanbaru (Riau Province). In order to implement management on the ground, the Loka KKPN formed a task force for Pulau Pieh NMRP which is based in Padang. Currently the task force consists of six staff that includes five technical staff and one administration staff. In terms of capacity on MPA management, two staff have been trained on basic MPA management (MPA101) and two other staff have been trained on sustainable fisheries management in MPA.

2. Final draft of management plan

   Preparation of Management and Zoning Plan document of Pulau Pieh NMRP was commenced in 2011, and started with the establishment of a working group. The

working group did ecological and socio-economic studies to describe ecological and socio-economic situation condition of local people living in and adjacent to the MPA, and identifying issues and threats that relevant to MPA management. Series of public consultations both at community level and district level had also been carried out to collect inputs for the perfection of management and zoning plan.

3. Facilities and infrastructure

   A well-equipped field office is the current existing facility and the existing basic infrastructure to support management implementation includes survey equipment (for monitoring), speedboat, rubber boat, GPS, and motorbike.

4. Financial support

   Budget for office operation and some management implementation in Pulau Pieh NMRP are currently fully provided by national budget of 2011 to 2013.

Achievement of green level includes the following aspects:

1. Effort to initiate partnerships with stakeholders

   Initiative to develop partnership with stakeholders had been carried out through collaborative patrol and surveillance, involving Police, the Navy, PSDKP (patrol unit under the MMAF), Balai KSDA (Natural Resources Conservation Office of Ministry of Forestry), Marine Affairs and Fisheries Office of West Sumatra Province, and district Marine Affairs and Fisheries offices.

2. Adequate equipment for office operation

   Existing equipment to support office operation include furniture, computers, communication devices, motorbike, office supplies, camera, and filing cabinets.

3. Financial support and planning

   Financial plan for Pulau Pieh NMRP is included in the annual work plan its management and zoning plan document. Activities such as regular monitoring and surveillance are supported by national budget. Deficiencies in financial support is planned to be met by other sources such as the COREMAP-CTI Project and Corporate Social Responsibility (CSR) funds.

4. Final management and zoning plan document of Pulau Pieh NMRP has been submitted for approval from Minister of Marine Affairs and Fisheries on April 2013.

5. SOP of Administration and Financial Management has been developed.

6. The MPA has been legally designated by Minister of Marine Affairs and Fisheries Decree No.70-2009.

Achievement of blue level includes the following aspects:

1. MPA legal status

   Socialization of MPA legal status had been conducted through series of meetings with local community and other stakeholders at district and provincial levels.

2. Development of boundary system

   The development of MPA boundary was initiated on 2011 by establishment of a committee, involving various agencies from central and local government. Informal meeting was carried out in 2013 between the local committee and central government committee, and followed by ground verification.

3. The Pulau Pieh NMRP has been acknowledged and included in both provincial and district marine spatial plans.

5.2.2 Recommendation to improve management effectiveness of Pulau Pieh NMRP

To improve management effectiveness level of Pulau Pieh MPA towards 100% of green level, the following are recommended:

1. The management unit should achieve adequate number and qualifications of MPA managers

   Staff of Pulau Pieh NMRP should fulfill at least two of the following standard competency for MPA management: (i) MPA planning, (ii) monitoring and evaluation, (iii) surveillance, (iv) research, (v) natural resources survey/monitoring, (vi) socio-economic survey/monitoring, and (vii) fisheries management.

2. The management unit should meet adequate facilities and infrastructure to support MPA management

   It is recommended to provide or improve the following facilities: (i) patrol boat, (ii) information board on zoning and zoning regulation, (iii) communication devices related to surveillance activity, (iv) tourism facilities and infrastructures, (v) jetty, (vi) information center, and (vii) mooring buoy.

3. The management unit should legalize the management and zoning plan document.

   Currently the document is being evaluated for approval by the Minister of Marine Affairs and Fisheries.

4. The management unit should prepare for Standard Operational Procedure (SOP) for office operational and MPA management

   SOP for office operational includes office administration, finance, facilities and infrastructure management. While the basic SOP for MPA management include joint patrols, resource management, institutional strengthening, and socio-economic and cultural strengthening.

5. The management unit should execute the management and zoning plans

   The following programs in the implementation of the MPA management should be conducted: institutional strengthening, resource management, strengthening of the socio-economic and cultural, one form of utilization for tourism within the MPA, fisheries management (capture and aquaculture), and research and education.

6. GENERAL RECOMMENDATION AND NEXT STEPS

6.1. General Recommendation

1. In order to follow-up recommendations from this assessment, both MPAs need to strengthen their management capacity by achieving the required Special Standard Competency level through capacity development scheme organized by the Agency for Human Resource Development (BPSDM) of MMAF.

2. In regards to Pulau Pieh NMRP, the existing management unit (i.e. Pieh task force) should be elevated to strengthen its management and budgeting authority (i.e. as technical implementing unit). In the case of Sabang MPA, however, it should be established as district-technical implementing unit (UPTD) beyond the current organizational structure (under sub-division of District Marine Affairs and Fisheries Office).

3. In order to improve their management effectiveness, both MPAs should address the following management issues: making available adequate facilities and infrastructure; involving community and stakeholders in the management through partnership; producing utilization plans for tourism, fisheries management (capture and aquaculture), research, and education.

6.2. Next Step

To facilitate the effective implementation of E-KKP3K evaluation and monitoring tool on the ground, the tool needs to be equipped with supporting technical guidelines to make it more applicable to the MPA managers and evaluators

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Annex 1. List of facilitators and participants of workshop for Sabang District MPA.

No	Name	Institution
Facilitators		
1	IrfanYulianto	Wildlife Conservation Society
2	M. Khazali	Conservation International
3	Dr. Arisetiarso Soemodinoto	The Nature Conservancy
4	Ahmad Mukminin	Wildlife Conservation Society
5	Rakhmat Dirgantara	Fauna Flora International
6	Yudit Tia Lestari	Dit. KKJI, KP3K, KKP
Participants		
1	Cut M.Daud	Panglima Laut Lampuuk
2	Junaini Yusuf	KRL Litok
3	Surya Irawan	DKP Aceh Jaya
4	Daniwaldi	DKP Aceh Besar
5	Nazaruddin	DKP Aceh
6	Sofianna	DKP Aceh
7	Zariansyah	FFI Aceh
8	Ikhsan	KKL Lhok Keuluang
9	Muhammad Aswad	DKP Aceh
10	Sulfianto	DKP Simeulue
11	Isdawati	DKP Simeulue
12	Arnan	Panglima Laot
13	Iskandar	DKP Aceh Besar
14	Fifi Zuliany	DKP Aceh
15	Aniban	Aceh Besar
16	Ramziah An Najah	Universitas Abulyatama
17	Alyadi	Bappeda Aceh Besar
18	Mutiara Andrita	DKP Aceh
19	Erdiansyah	FFI Aceh
20	Dewi Nopita Sari	WWF

21	Nurlaili	DKP Aceh
22	Maisa	DKP Aceh Jaya
23	Marzuki	Kuala
24	Saifullah	DKP Sabang
25	Tetty Meutia	Bappeda Sabang
26	Faisol	Panglima Laot Anoi Itam
27	Effendi	Panglima Laot Ie Meulee
28	Syahrul Purnawan	Universitas Syah Kuala
29	Sayyid Afdhal	Universitas Syah Kuala
30	Faisal Syahputra	Universitas Abulyatama
31	Erry W	DKP Aceh
32	Ummi Setiawati	Aceh

Annex 2. List of facilitators and participants of workshop for Pulau Pieh NMRP

No	Name	Institution
Facilitators		
1	Yudi Herdiana	Wildlife Conservation Society
2	M. Khazali	Conservation International
3	Dr. Arisetiarso Soemodinoto	The Nature Conservancy
4	Yudit Tia Lestari	Dit. KKJI, KP3K, KKP
5	Teguh Satria	Dit. KKJI, KP3K, KKP
Participants		
1	Akhiruddin	SUPM - Pariaman
2	Darmawan	LKKPN Penakbaru
3	Ahsanal Kasasiah	Dit. KKJI, KP3K, KKP
4	Devi Mena	Bappeda Padang Pariaman
5	Ria Sanusi	DKP Prov Sumatera Barat
6	Yosmeri	DKP Prov Sumatera Barat
7	Andry	BPSPL Padang
8	Nilfa Rasyid	Dit. KKJI, KP3K, KKP
9	Mabruri Tanjung	University Bung Hatta
10	Darpius Indra	DKP Pasaman Selatan
11	Suparno	University Bung Hatta
12	Henny Delvira	BPSPL Padang
13	Suwinda P.	BPSPL Padang
14	Ferialdi	DKP Kota Pariaman
15	Rudi	DKP
16	Samsul Bahri	LKKPN Pekanbaru
17	Andriyatno Hanif	SatkerTWP PulauPieh
18	Jemaislia	Bappeda Padang
19	Firma Harini	DKP Padang Pariaman
20	Albert Krisdianto	DKP Prov Sumatera Barat
21	Usman	DKP Padang Pariaman

22	Nofiarman	DKP Padang
23	Riska EkaPutri	DKP Padang
24	Harrison	Bappeda Pasaman Selatan
25	David Ikhsan	Bappeda Kota Pariaman
26	Edmondri	DKP Pariaman
27	Rivo Armir	DKP Prov Sumatera Barat
28	Nelly Yulius	Dit. KKJI, KP3K, KKP

Annex 3. List of participants of national workshop of BOBLME, Jakarta

No	Name	Institution
1	Ahsanal Kasasiah	Dit. KKJI, KP3K, KKP
2	Hendra Y Siry	Dit. PL, KP3K, KKP
3	Fegi Nurhabni	Dit. PL, KP3K, KKP
4	M. Khazali	Conservation International
5	Ferry	Roren, Setjen KKP
6	Darmawan	Loka KKPN Pekanbaru
7	Kurniawan	PSDKP, KKP
8	Sutraman	The Nature Conservancy
9	Ari Soemodinoto	The Nature Conservancy
10	Aris Wibowo	Dit. PL, KP3K, KKP
11	Salam Tarigan	P2O LIPI
12	Ahmad Aris	LKKPN Pekanbaru
13	Ria	Coral Triangle Center
14	Albar K	DKP. Prov. Sumbar
15	Donny R	DKP. Prov. Sumbar
16	Dadang S	Konsultan
17	Wiwik Wulandari	Dit. SDI, DJPT, KKP
18	David	Dit. SDI, DJPT, KKP
19	Hari Chrystijanto	Dit. SDI, DJPT, KKP
20	Handoko Adi S	RARE
21	Imran Amin	The Nature Conservancy
22	Yudi H	Wildlife Conservation Society
23	Bayu Adi S	Dit. KKJI, KP3K, KKP
24	Amak P	Dit. KKJI, KP3K, KKP
25	Nelly Yulius	Dit. KKJI, KP3K, KKP
26	Suraji	Dit. KKJI, KP3K, KKP
27	Nilfa Rasyid	Dit. KKJI, KP3K, KKP
28	Teguh Satria G	Dit. KKJI, KP3K, KKP

29	Yudit Tia L	Dit. KKJI, KP3K, KKP
30	Ana R	Dit. KKJI, KP3K, KKP
31	Risris S	Dit. KKJI, KP3K, KKP
32	Budhi S	Dit. KKJI, KP3K, KKP
33	Ruswan	Dit. KKJI, KP3K, KKP
34	Dimas A	Dit. KKJI, KP3K, KKP
35	Ahmad Sofuilah	Dit. KKJI, KP3K, KKP
36	Suyono	Dit. KKJI, KP3K, KKP
37	Asri S Keyo	Dit. KKJI, KP3K, KKP
38	Dyah Retno W	Dit. KKJI, KP3K, KKP
39	Diesta S Ulya	Dit. KKJI, KP3K, KKP
40	Christian Novia NH	WWF Indonesia
41	Mudatsir	Sesditjen, KKP
42	Asril	CI
43	Sunaryanto	IFAD
44	Rosi	BKKPN
45	Andi	BPSPL
46	A.Junaedy	LPSPL
47	Nunik	BPSPL
48	Aby	KKP
49	Rahmadani	DKP
50	Andika	DKP

Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are working together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project to lay the foundations for a coordinated programme of action designed to better the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

The Food and Agriculture Organization (FAO) is the implementing agency for the BOBLME Project.

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For more information, please visit www.boblme.org

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